Ransburg

SERVICE MANUAL
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TURBODISK ™ APPLICATOR ASSEMBLY

MODEL: A11376

CE

IMPORTANT: Before using this equipment, carefully read SAFETY PRECAUTIONS, starting on page 1, and all instructions in this manual. Keep this Service Manual for future reference.

Service Manual Price: $50.00 (U.S.)

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SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your Ransburg products. This manual contains information that is important for you to know and understand. This information relates to USER SAFETY and PREVENTING EQUIPMENT PROBLEMS. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

A WARNING! states information to alert you to a situation that might cause serious injury if instructions are not followed.

A CAUTION! states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

A NOTE is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Ransburg equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your Ransburg system, contact your local Ransburg representative or Ransburg.

⚠ WARNING

> The user MUST read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.

> This manual MUST be read and thoroughly understood by ALL personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the WARNINGS and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as NFPA- 33 SAFETY STANDARD, prior to installing, operating, and/or servicing this equipment.

⚠ WARNING

> The hazards shown on the following page may occur during the normal use of this equipment. Please read the hazard chart beginning on page 2.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Spray Area 	Fire Hazard Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent power supply shutdown indicates a problem in the system requiring correction.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance. When using solvents for cleaning: Those used for equipment flushing should have flash points equal to or higher than those of the coating material. Those used for general cleaning must have flash points above 100°F (37.8°C). Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents. Electrostatic arcing must be prevented. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled. Never use equipment intended for use in waterborne installations to spray solvent based materials. The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, and OSHA requirements.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
General Use and Maintenance 	Improper operation or maintenance may create a hazard. Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA-33. Instructions and safety precautions must be read and understood prior to using this equipment. Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, and your insurance company requirements.
Electrical Equipment 	High voltage equipment is utilized. Arcing in areas of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shutdown indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	The power supply, optional remote control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas. Refer to NFPA-33. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Explosion Hazard / Incompatible Materials 	Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1,-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your material supplier. Any other type of solvent may be used with aluminum equipment.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Toxic Substances 	Certain material may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Material Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area / High Voltage Equipment 	There is a high voltage device that can induce an electrical charge on objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed must be supported on conveyors or hangers and be grounded. The resistance between the part and ground must not exceed 1 megohm. All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Any person working in the spray area must be grounded. Unless specifically approved for use in hazardous locations, the power supply and other electrical control equipment must not be used in Class 1, Division 1 or 2 locations.
Personnel Safety/ Mechanical Hazards 	The disk atomizer can rotate at speeds up to 40,000 RPM. At these speeds, the edge of the applicator can easily cut into skin. Loose articles can also be caught by the rotating disk.	Personnel must stay clear of the disk whenever it is rotating. Before touching the disk, the turbine air must be shut off. If the disk has been rotating, allow at least three minutes for it to come to a complete stop before touching it.

INTRODUCTION

FEATURES

Features which make the Turbodisk™ Applicator advantageous for use in electrostatic applications include:

- Proven turbine motor reliability.
- Aerodynamic fairing design for ease of cleaning of external surfaces.
- Speed readout (or control) uses reliable magnetic pickup for fiber optic transmission of rotational speed data (optional).
- A majority of all assembly components which come in contact with the fluid material are made of stainless steel, which is impervious to most fluids.
- Negligible maintenance down time.
- The easily removable lower fairing, turbine air motor assembly, and the externally mounted regulators and fluid valves, make off line maintenance more efficient and economical.
- Higher fluid delivery rates can be achieved using a dual feed fluid system.
- High flow regulators and fluid valves provide for simultaneous paint push out while solvent washes the feed tube and disk.

GENERAL DESCRIPTION

The Turbodisk Applicator, because of it's high rotational speed, produces finer atomization, improved quality, and higher transfer efficiency with any of the wide variety of coating materials (such as waterborne and high solids) used in production finishing operations. Its speed is controlled by varying the drive air. The applicator assembly is designed for use on vertical overhead mounted reciprocators.

Conical Disk Assembly

The Turbodisk Applicator uses conical disk assemblies that are made from high grade aluminum construction and are force balanced to .10 grams•in or better. With the serrated edge, these disks come in sizes of 6, 9, and 12 inch diameters.

Turbodisk Fairing (Refer to Figure 17)

The Turbodisk Applicator fairing is required for safe operation. The two piece fairing provides high voltage isolation from the metal rotator assembly and valve components, as well as ease of cleaning and maintenance.

⚠ WARNING

> Both sections of the fairing to be in place when the Turbodisk is in operation or when high voltage is supplied to the applicator.

Paint Valve Options

Several valve options are available for both single and dual feed.

Options are:

- No Valves
- 3-Way Valves
- Trigger and Dump Valves with DR-1 Regulator
- Trigger Valve Only
- Trigger and Dump Valves with Dual DR-1 Regulators
- Trigger Valves with DR-1 Regulator

Power Supply and Controls

In the system, the high voltage is supplied to the Turbodisk by either the MicroPak™ Industrial power supply system or a Voltage Master™ series power supply.

The MicroPak Industrial power supply uses proven high voltage generator technology that is microprocessor controlled for diagnostics and communication. The controller is packaged in standard rack mounted Eurocard format for easy access and system integration.

The Voltage Master™ power supplies are general purpose heavy duty power supplies with years of proven reliability. They have variable voltage control, many safety features, and remote analog voltage control capabilities.

SPECIFICATIONS

Mechanical

Turbine Speed:	Variable to 40,000 rpm max. (6-inch conical disk)
Turbine Type:	Ball Bearing
Weight:	57-lbs. (approximately)
Length:	36-inches
Diameter:	13.25-inches
Turbine Air:	At max. speed (40k rpm), requires 103.1 psi and 61.1 SCFM, unloaded (See "Typical Speed Chart" in this section.)
Air Temp °F:	120°F maximum at applicator

Fluid Pressure
Inlet: (See "Fluid and Air Pressure Regulator" in the "Operation" section.)

Single Fluid Flow Range:

Waterborne:	To 1,200 cc/min. maximum
Solvent Base:	To 1,500 cc/min. maximum
High Solids: maximum	To 1,000 cc/min. (80%+)

Air Inlet
Trigger / Dump: 70-100 psi

Air Pilot for Fluid
Pressure: (See "Fluid and Air Pressure Regulator" in the "Operation" section.)

Electrical

Power Supply Type:	MicroPak Industrial or Voltage Master™
Charging Method:	Direct
Input Voltage:	0-100 kV
Turbine Speed Control or Monitor:	PulseTrack 2(Optional)

TYPICAL SPEED CHART (RPM's)

(No Load)
(Refer to "Typical Speed Chart")

The following represents data collected under lab conditions. Flow meters were installed on each of the two 3/8-inch ID heated air lines used to supply the Turbodisk turbine motor. The airflow through each flow meter was recorded and added together to obtain the total air flow through the system. The speed of the disk was monitored through the means of a PulseTrack system. The air heater was set at 120 degrees during all data collection.

Rotational speeds are unloaded and can be expected to drop 20 to 30% when under a fluid load condition. Heated turbine air increases efficiency of motor up to 10%. This chart should be used as a guide ONLY. Speeds will vary due to rotator wear, tubing size or lengths, etc.

NOTE

> Never run disk over it's maximum safe operating speed.

NOTE

> Air heater removes condensation from OD of motor at high speeds.

NOTES

TYPICAL SPEED CHART - 10 HOLE ORIFICE PLATE (NO LOAD)

6" Conical Disk

Disk Speed (RPM)	Supply Air Pressure (PSI)	Air Flow #1 (SLPM)	Air Flow #2 (SLPM)	Total Air Flow (SLPM)	Total Air Flow (SCFM)
5,000	6.6	140	100	240	8.5
10,000	10.5	190	140	330	11.7
15,000	18.2	260	200	460	16.2
20,000	27.8	340	260	600	21.2
25,000	40.4	440	350	790	27.9
30,000	56.3	560	460	1,020	36.0
35,000	76.4	730	610	1,340	47.3
40,000	103.1	930	800	1,730	61.1

9" Conical Disk

Disk Speed (RPM)	Supply Air Pressure (PSI)	Air Flow #1 (SLPM)	Air Flow #2 (SLPM)	Total Air Flow (SLPM)	Total Air Flow (SCFM)
5,000	11.3	200	140	340	12.0
10,000	26	330	250	580	20.5
13,000	39.5	430	340	770	27.2
16,000	55.4	560	460	1,020	36.0
19,000	79.8	760	640	1,400	49.4
22,000	102	930	800	1,730	61.1

12" Conical Disk

Disk Speed (RPM)	Supply Air Pressure (PSI)	Air Flow #1 (SLPM)	Air Flow #2 (SLPM)	Total Air Flow (SLPM)	Total Air Flow (SCFM)
2,000	8.7	170	120	290	10.2
4,000	18.6	270	200	470	16.6
6,000	31.0	370	290	660	23.3
8,000	48.3	500	400	900	31.8
10,000	68.5	670	560	1,230	43.4
12,000	95.8	880	750	1,630	57.6
12,500	102.0	930	780	1,710	60.4

INSTALLATION

EQUIPMENT

This system should be installed by, or under the supervision of an Ransburg representative. Should the need arise to replace any component assembly within the system, contact your Ransburg representative.

This manual concerns normal operation, maintenance, and service of the specified applicator assemblies. The air and fluid connections vary with different models and installations. This manual deals primarily with those at, or within the assembly.

AIR CONTROL
(Refer to Figure 1)

Air control of the applicator is from a standard Ransburg air logic panel, which includes two filters (one 40 micron filter located at the air logic station and one 5 micron filter located at the inlet of the in-line air heater panel). Clean, dry factory air must be provided to the inlet filter of the air logic station via a minimum 1/4-inch ID pipe and to the inlet filter of the heater panel via a minimum 3/4-inch ID pipe.

⚠ WARNING

> The Air Heater Assembly must be located outside of any hazardous areas as defined by the NFPA-33,

MOUNTING
(Refer to Figure 16)

The Turbodisk assembly is mounted on the reciprocator using four (4) 5/16-18 screws provided on the ram flange. Loosening two (2) 1/4-20 screws on the same ram flange will allow the assembly to rotate. Position the Turbodisk assembly so that the strain relief boot is positioned toward the incoming fluid and air lines and retighten.

Remove lower fairing. Thread all the required air, high voltage, fiber optic, and fluid service lines through the strain relief boot. The strain relief boot may have to be cut larger in order to feed all the lines through.

Reinstall lower fairing. Install conical disk and torque to 50-70 lbs•in (5.65-7.91 Nm).

INTERLOCKS

Flow of coating material should be locked out unless all of the following conditions are met:

1. Booth exhaust is turned on.
2. The turbine is spinning.
3. High voltage is on or in the bypass mode.

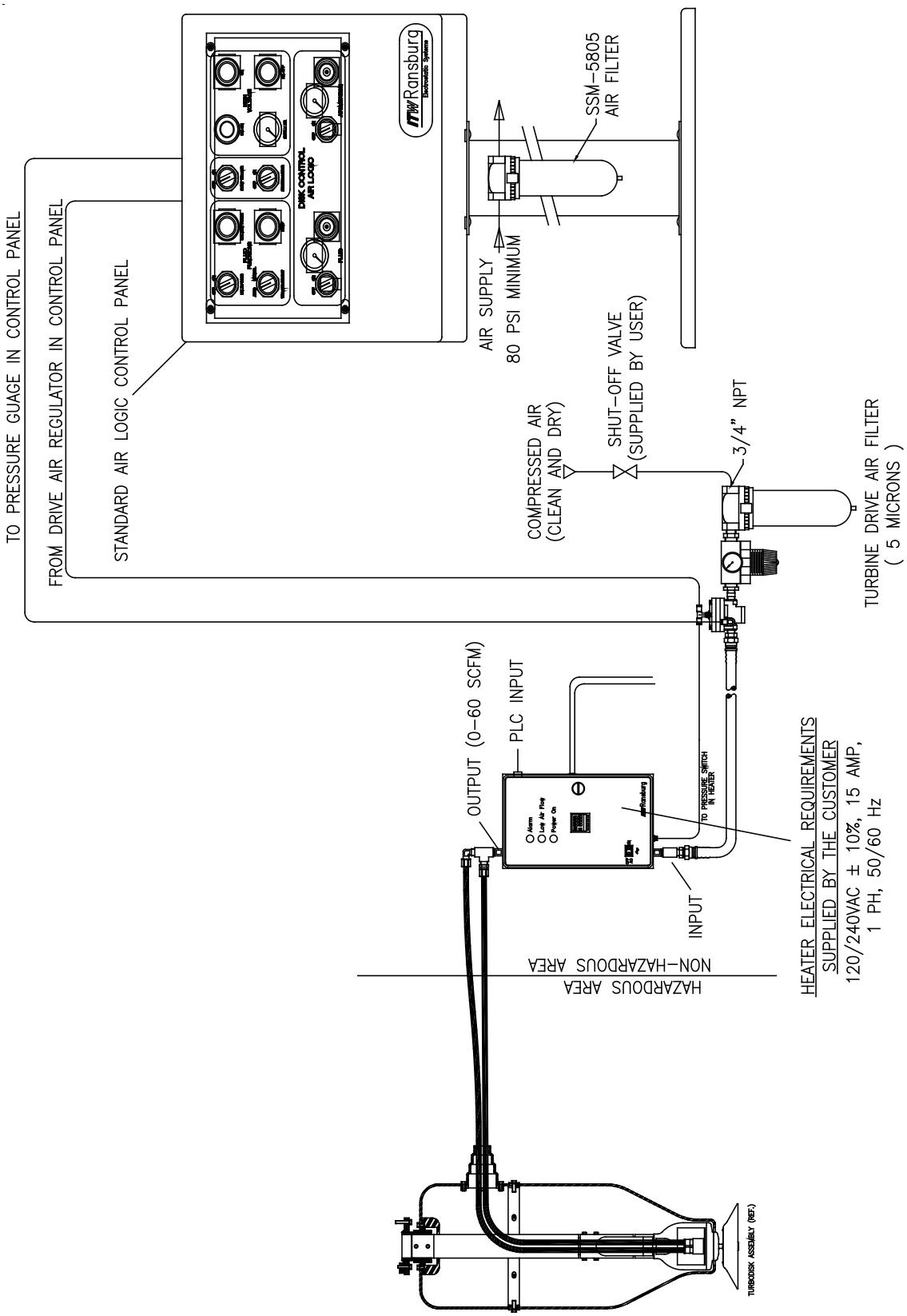


Figure 1: Typical Layout of System

OPERATION

CAUTION

> Fluids and lubricants used in this system must contain NO silicones!

> Do NOT operate the unit without an atomizer disk! Without a disk, overspeed, resulting in premature bearing failure, is possible.

> The air supplied to the motor must be dry, clean, and free of oil or moisture. The atmospheric dew point should be 10°F or less. The air heater used should be adjusted only high enough to prevent condensation from forming on the motor housing or at the exhaust port.

WARNING

> Operators must be fully trained in safe operation of electrostatic equipment. Operators must read all instructions and safety precautions prior to using this equipment (see NFPA-33).

As with any spray finishing system, operation of the Turbodisk involves properly setting the operating parameters to obtain the best finish quality for the coating material being sprayed, while maintaining correct operation and reliability of the equipment used. Adjustments to operating parameters, which cover spraying, cleaning, and on/off control, include:

- Fluid Type
- Fluid Flow Rate
- Turbine Speed
- Electrostatic Voltage
- Target Distance

WARNING

> DO NOT exceed the maximum flow rate of 1500 cc/min. during painting or purge cycles. Excessive fluid flow may cause an imbalance condition and possibly premature bearing failure.

AIR HEATER REQUIREMENTS

Turbine drive air expands as it moves through the turbine wheel cavity and as it exits the turbine from the exhaust port. This expansion will cause cooling of the exhaust air and the surfaces it contacts. This cooling effect can cause surface temperatures to fall below the dew point of the booth, which will result in condensation on the interior and exterior of the atomizer, machine, and its components. It is even possible that the temperature of the supply air may be below the booth dew point, even without additional expansion cooling.

Condensation is especially probable in waterborne applications when booth temperature and relative humidity levels are typically maintained very high. This condensation will allow sufficient conductivity of the surfaces such that they act as an erratic ground source potential. This can cause damage to the equipment.

It is therefore, a requirement that turbine exhaust air temperature be maintained about the booth dew point to prevent condensation from forming on atomizer surfaces. Doing so will eliminate moisture as a potential defect in painted surfaces as well as extending equipment life. Thus, it is recommended that air heaters be installed into the atomizer air supply lines, i.e. turbine drive air. The air heaters must be of sufficient capacity, capable of raising the incoming air temperature at least 40°F (4.4°C) at a flow rate of 60 SCFM per applicator.

The actual air heater process setting depends on the applicator fluid flow rate load, booth conditions, turbine airflow settings, and incoming air temperature.

The heater should be set as low as possible, sufficient to maintain the applicator surface temperatures above the dew point in the booth.

Example: Only with the incoming air temperature at 72°F (22.2°C), a disk rotating unloaded at 30 krpm has a turbine outlet temperature drop of approximately 28°F (-2.2°C) (@ 40 krpm unloaded, DT ~ 14°F (-.10°C)). Referring to the ASHRAE Psychrometric chart, the saturation temperature range (dew point) of a spray booth maintained at 70-75°F / 65-70% RH is 62-68°F (21.1-23.9°C / 76-70° RH is 16.7-20°C). Thus, it is almost certain that the surface temperatures of the applicator will fall below the dew point of the booth, and an air heater will be needed in this case.

To prevent condensation, an air heater assembly should be assembled after air filters. (Reference the current “Air Heater Assembly” service manual for further information.)

NOTE

> Failure to use an air heater may cause damage to equipment or ruin the finished component being processed.

COATING MATERIALS

The Turbodisk can be used with a broad range of coating material conductivities. However, with waterborne paints, it may be necessary to isolate the paint supply from ground.

⚠ WARNING

> Isolated fluid supplies using either waterborne or highly conductive solvent base coatings can produce hazardous high voltage discharges which can cause fires or injury to personnel.

FLUID FLOW CONTROL
(Refer to Figures 14 and 15)

Fluid flow control is dependent on the valve configuration of the Turbodisk . If the Turbodisk is configured with no valves or a 3-way valve, fluid flow is controlled externally at the paint source. If the Turbodisk is equipped with a regulator, fluid flow can be controlled via the air pilot signal. The high flow and low flow regulators each have procedures on how to control and deliver consistent fluid flows. For more information on controlling the fluid delivery using regulators, refer to that specific manual which is included with the system.

To check fluid flow rates, the disk must be removed. See the "Maintenance" section for "Removal Procedure". The fluid can then be manually triggered to measure actual flow in a graduated beaker over a specified time period.

⚠ WARNING

> Danger of shock and/or personal injury can occur. Proper grounding procedures, which are outlined in the ITW Ransburg safety bulletins, must be followed. Personnel must never work near or perform work on the turbine when the turbine is spinning or when high voltage is on.

FLUID VALVE CONTROL

Trigger and Dump
(Refer to "Turbodisk Fluid and Air Pressure Requirements")

The fluid valves in the Turbodisk are actuated by an air signal. The air pressure must exceed 70 psi to assure proper actuation of the valve. Applying air to the valve actuator turns on the fluid flow for that valve.

The trigger valve controls the paint flow to the disk. When actuated, paint flows through the valve to the fluid tube. The disk should be spinning at a rpm speed that is fast enough, (that when fluid is turned on) to enable the fluid to flow through the disk paint passage holes and be atomized.
The dump valve controls the paint flow through the dump line. When actuated, paint flow is directed to the dump return line. This provides a method of rapidly removing paint from the incoming line for cleaning and/or color change. Normally, the dump valve is not actuated at the same time as the paint trigger valve since the trigger valve is intended to cause the fluid flow to the disk at the prescribed input pressure.

FLUID AND AIR PRESSURE REQUIREMENTS
(Refer to "Turbodisk Fluid and Air Pressure Requirements")

Fluid and air pressure requirements are dependent on the fluid trigger valve configuration.

TURBODISK FLUID AND AIR PRESSURE REQUIREMENTS

	No Valves	3-Way ON/OFF (18283)	Trigger/Dump W/High Flow (70171-04) Regulator	Trigger/Dump W/Low Flow DR-1 (74151) Regulator
Air Pilot Fluid Regulator	----------	----------	100 psi max.	100 psi
Air Inlet Trigger/ Dump Valve	----------	120 psi max.	70-100 psi	70-100 psi
Fluid Inlet Pressure	----------	300 psi max.	80-100 psi max.	80-100 psi max.
Solvent Inlet	----------	30-60 psi max.	30-60 psi max.	30-60 psi max.

Note: Trigger/dump valves (CCV-403-SS) are rated to 300 psi maximum inlet fluid pressure but are limited to the lower pressure limit of the fluid regulators.

TURBINE SPEED

Turbine speed is determined by the drive air pressure at the rotary atomizer and fluid flow rate.

Turbine speed can be closed loop controlled using the fiber optic speed transmitter mounted at the back of the turbine rotator assembly as a speed input to remote speed controls such as the PulseTrack 2.

NOTE

> The disk rotational speed determines the quality of atomization and can be varied for different flow rates and viscosities. For optimum transfer efficiency and spray pattern control, the disk rotational speed should be set at the minimum required speed to achieve proper atomization.
Excessive speed reduces transfer efficiency!

⚠ WARNING

> Do not exceed the maximum rated speed of 40,000 rpm for the 6 inch conical disk and 27,000 rpm for the 6 inch uni-disk. This maximum speed includes speed overshoot when fluid delivery is stopped. Damage to persons or equipment may result in over-speed conditions.

Atomizers

(Refer to "Typical Maximum Safe Operating Speeds")

⚠ WARNING

> Never operate any disk atomizer in excess of it's maximum rated speed ("K" number) as listed in the service manual. Excessive speed may cause the disk to disintegrate, causing serious damage and/or injury.

All atomizers manufactured after April 6, 1982, bear a "K" number. That number indicates the maximum safe rotation speed for that series in tens of thousands.

For example:

9K = 9,000 rpm maximum safe speed,
40K = 40,000 rpm, etc.

If you have an atomizer that does not have a "K" number, contact your ITW Ransburg repre-sentative for its maximum safe operating speed.

⚠ WARNING

> Inspect disk platter daily for wear or damage. Replace if excessively worn or damaged. Worn or damaged disk platters can cause an imbalanced condition and shorten bearing life. Warranty will be voided if damaged disks are used.

TYPICAL MAXIMUM SAFE OPERATING SPEEDS		
Disk Type	Part Number	Max. RPM
None	--	--
Conical Disk Assy., Serrated, 6", Aluminum, Not Anodized	20485-62	40,000
Conical Disk Assy., Serrated, 6" Aluminum, Anodized	20485-65	40,000
Conical Disk Assy., Serrated, 9", Aluminum, Not Anodized	20485-92	25,000
Conical Disk Assy., Serrated, 9", Aluminum, Anodized	20485-95	25,000
Conical Disk Assy., Serrated, 12", Aluminum, Not Anodized	20485-122	15,000
Conical Disk Assy., Serrated, 12", Aluminum, Anodized	20485-125	15,000
Uni-Disk Assy., 6", Aluminum, Not Anodized	19830-06	27,000
Uni-Disk Assy., 8", Aluminum, Not Anodized	19830-08	23,000
Uni-Disk Assy., 10", Aluminum, Not Anodized	19830-10	15,000
Uni-Disk Assy., 12", Aluminum, Not Anodized	19830-12	15,000

ELECTROSTATIC VOLTAGE

In the system, the high voltage is supplied to the Turbodisk by either the MicroPak Industrial power supply system or Voltage Master series power supplies.

The MicroPak industrial power supply uses proven high voltage generator technology that is microprocessor controlled for diagnostics and communication. The controller is packaged in standard rack mounted Eurocard format for easy access and system integration.

The Voltage Master power supplies are general purpose heavy duty power supplies with years of proven reliability. They have variable voltage control, many safety features, and remote analog voltage control capabilities.

TARGET DISTANCE

The distance between the Turbodisk and the target will affect the finish quality, penetration, and efficiency. Closer distances give wetter finishes and greater efficiency, while greater distances give drier finishes. The recommended normal disk edge to target range is 12-inches (305mm) minimum for optimum performance.

NOTES

MAINTENANCE

GENERAL

Verify daily that the operating parameters have not varied dramatically. A sudden change or even a gradual decay in performance could be early indications of component failure.

Normal maintenance procedures should be established and recorded at the initial start-up. All maintenance schedules are subject to variation based on use. Periodically review these maintenance schedules as equipment ages and needs change.

CLEANING PROCEDURES

WARNING

> Electrical shock and fire hazards can exist during maintenance. The power supply must be turned off before entering the spray area. Spray booth fans should remain on while cleaning with solvents.

> Never touch the disk atomizer while it is spinning. The edge of the disk can easily cut into human skin, gloves or other materials. Be sure the disk atomizer has completely stopped spinning before attempting to touch it. Approximate time for the disk to stop spinning after turning off the drive air is about three minutes.

In addition to the above Warning, which relates to potential safety hazards, the following information must be observed to prevent damage to the equipment.

WARNING

> Because of the hazard of bearing penetration, solvents should be used sparingly! They should NEVER be hosed directly onto the atomizer, motor housing, or any fiber optic juncture.

WARNING

> NEVER wrap the applicator in plastic to keep it clean. A surface charge may build up on the plastic surface and discharge to the nearest grounded object. Efficiency of the applicator will also be reduced and damage or failure of the applicator components may occur. WRAPPING THE APPLICATOR IN PLASTIC WILL VOID WARRANTY.

CAUTION

> Do not immerse the Turbodisk assembly in solvent or other liquids. Turbine components will be damaged.

> Do not soak the disk in solvent longer than 24 hours.

WARNING

> Inspect disk platter daily for wear or damage. Replace if excessively worn or damaged. Worn or damaged disk platters can cause an imbalanced condition and shorten bearing life. Warranty will be voided if damaged disks are used.

Internal Fluid Path Cleaning

With the high voltage turned off and the disk spinning, flush cleaning solvent through the incom-ing paint line or through the solvent inlet line. If it is desired to clean just the face of the disk off, flush solvent through the solvent inlet. If a color change is required, flush the entire system. The spinning disk will atomize the solvent and clean out the disk passages. If equipped, trigger the dump valve to catch the wasted paint from the incoming line, then flush the disk with solvent after closing the dump valve.

WARNING

> Never submerge a disk into a solvent bath while still mounted on the shaft. Solvent may intrude into bearing cavity and destroy the grease. Remove disk to hand clean or run disk and flush through trigger and dump valves.

NOTE

> Solvent flushing of the system (except during color change) should be done with the disk dismounted and with waste solvent collected in a grounded container.

External Atomizer Surface Cleaning

WARNING

> To reduce the risk of fire or explosion, OSHA and NFPA-33 require that solvents used for exterior cleaning, including disk cleaning and soaking, be nonflammable (flash points higher than 100°F/37.8°C). Since electrostatic equipment is involved, these solvents should also be nonpolar. Examples of nonflammable, nonpolar solvents for cleaning are: Amyl acetate, methyl amyl acetate, high flash naphtha and mineral spirits.

> Do not use conductive solvents such as MEK to clean the external surfaces of the Turbodisk.

> Never lower the Turbodisk assembly into a drum for flushing or color changing.

Disk Cleaning

Normally, the internal cleaning instructions will suffice to clean the disk. If flushing the disk does not remove all the residue, the disk may be removed for hand cleaning. Unscrew mounting nut and remove the disk by using the supplied disk puller.

NOTE

> The turbine shaft must be held with a 7/16" open end wrench while using the disk puller.

WARNING

> Do not hold disk edge during removal. This could result in injury.

Inspection of the disk is required to determine if wear to the serrated edge or damage has occurred. Wear can cause a reduction in transfer efficiency and excessive paint wrap on the atomizer fairing.

Clean the disk by soaking in an appropriate solvent to loosen paint residue. Do not soak for more than a 24 hour period. Use a soft cloth to remove the paint from the surface and a soft bristle brush to remove paint from the well area. The splash plate may need to be removed to clean the paint well. The screws must be retorqued to 24 lbs•in (2.71 Nm) after cleaning.

Reinstall the disk and torque the mounting nut to 50-60 lbs•in (5.65-6.78 Nm).

WARNING

> Do not attempt to clean the disk edge while it is rotating. Do not attempt to slow down or stop the disk by holding a rag or a gloved hand against the edge. This could cause physical harm and/or damage to the disk.

WARNING

> Replace disk platter if damaged. Warranty will be voided if damaged dish platter is used.

WARNING

> Inspect disk platter daily for wear or damage. Replace if excessively worn or damaged. Worn or damaged disk platters can cause an imbalanced condition and shorten bearing life. Warranty will be voided if damaged disks are used.

CAUTION

> Do not use abrasive materials which will scratch or damage the disk. Cleaning pads such as Scotch-Brite® should not be used.

> Using an atomizer disk with paint buildup may cause an imbalance. This may result in bearing damage and turbine failure. This condition may also stress the disk when operating at high speeds.

> Before reinstalling the disk onto the shaft, check and clean the tapered mating surface for paint residue.

> Care must be taken when mounting the disk assembly to the motor shaft. The mounting nut should turn freely for several turns until it fully bottoms on the disk assembly. Tighten to 50-70 lbs•in (5.65-7.91 Nm).

VIBRATION NOISE

If the Turbodisk is vibrating or making an unusual loud noise, it may mean that there is an unbalanced situation or a bearing failure. The disk could have dried paint or could be damaged. This situation should be corrected immediately. Do not continue to operate a noisy turbine.

WARNING

> If a disk has been mishandled or there appears to be damage on the face, DO NOT USE. Serious injury can result from rotating a defective disk. If there is a concern about the condition of a disk, please return it to Ransburg for evaluation.

TURBINE REPAIR AND REBUILD

Turbine motor must be returned to Ransburg for rebuilding.

Any attempt to disassemble turbine during warranty period will void the warranty.

VALVES AND REGULATORS

No maintenance is normally required on the valves or regulator other than flushing with solvent daily. Visual inspections should be made on the valves and regulator on a weekly basis. Should the valve or regulator not function properly, refer to the individual manuals for troubleshooting and repair procedures.

PREVENTIVE MAINTENANCE

Before any shutdown or maintenance, the fluid system should be thoroughly flushed. All cleaning should be done with a minimum of the appropriate clean solvent and clean, soft, lint free rags or soft brushes where indicated.

⚠ WARNING

> Do not stop disk rotation by using a rag or gloved hand.

> Make sure high voltage is off before approaching applicator.

> Follow proper grounding procedures.

⚠ CAUTION

> Because of the hazard of bearing penetration, solvents should be used sparingly. They should never be hosed directly onto the atomizer, motor housing or fiber optic juncture.

⚠ WARNING

> Personnel working on applicators MUST always be sure that the high voltage is off, the fluid system is flushed and off, the rotator has stopped, and that the grounding hook has been properly secured to the motor housing.

Daily Maintenance

- Clean the atomizer disk, motor housing, fairing, and as needed, the peripheral equipment with nonpolar high flash point solvents.

- To prevent solvent penetration beyond the slinger, a minimal air pressure of 5 to 10 psi should be applied to the motor in order to maintain a positive pressure. The motor should be run at operating speed for several minutes after cleaning to keep any solvent that has accumulated at the seals from penetrating into the motor housing.

⚠ WARNING

> Positive air pressure must be maintained to prevent solvent or paint intrusion into the bearings. Solvent and/or paint will degrade the grease in the bearings and cause failure. Warranty will not cover this!

- Inspect the disk edge and face. If damage exists, DO NOT USE. Return it to Ransburg for evaluation.

- Check the fluid feed tube to make sure it is not rubbing the disk.

Weekly Maintenance

Follow the normal daily maintenance schedule, then:

- Monitor rotational speed at the control and verify it is within 5% of target speed.

- Monitor high voltage output indicated on the power supply display. Verify with high voltage probe and meter.

- Remove fairing and clean all internal components: valves, regulators, and tubing. Check tubing for evidence of pin-holes, kinks, and abrasions.

- If the muffler needs to cleaned (item is to be solvent cleaned) remove it from the motor. Clean and dry the muffler before reinstalling it.

- Check fluid flows by removing the disk and manually triggering the paint valve. Measure the amount of fluid in a graduated beaker over a specific time to determine flow rate.

- Clean and inspect the disk face. Look for wear, which can cause poor transfer efficiency and excessive paint wrap on the atomizer fairing. Disk removal, cleaning and inspection may be done more or less frequently, depending upon use.

DISASSEMBLY PROCEDURES

Prior to disassembly, verify the following:

- The atomizer disk, valves and regulator have been flushed with solvent and purged dry with air.

- The disk has stopped rotating.

- The air supply to the trigger valves and regulator have been turned off.

- The fluid and solvent supply have been turned off and the pressure has been relieved.

- The high voltage has been turned off and the motor housing grounded.

Turbine Cartridge Exchange (Refer to Figure18)

Removal

1. Remove disk mounting nut by holding the rotator shaft above the disk with a 7/16-inch open end wrench and unscrewing the mounting nut with a 3/8-inch Allen wrench.

2. Install the ITW Ransburg 19850-00 disk puller into disk to remove it.

3. Carefully remove lower fairing.

⚠ WARNING

> Handle the disk with caution. The sharp edge can cut even though it is not rotating.

4. Next remove screws holding the fluid tube assembly.

5. With a 7/64-inch Allen wrench, remove six (6) socket head cap screws, which secures the turbine cartridge to the motor housing.

6. Using a 1/16-inch Allen wrench, turn each of the three (3) jack screws, located next to socket head cap screw, clockwise not more than one half turn at a time in sequence to separate the motor from the housing.

CAUTION

> Failure to perform this step correctly may result in misalignment and possible damage.

> Use caution in removing cartridge to prevent it from falling out of the housing.

CAUTION

> Any attempt to disassemble turbine during the warranty period will void the warranty.

Installation

Always check the inside of the motor housing and clean, if required, with a minimum amount of an appropriate cleaning solvent and a soft cloth.

1. Using a 1/16-inch Allen wrench, retract the three (3) jack screws.

2. With o-rings in place on the nozzle plate and housing, insert the turbine cartridge into motor housing.

CAUTION

> Lightly lubricate o-rings with petroleum jelly before assembly. Fit parts with o-rings very carefully. They must not be allowed to distort, unseat or break.

3. Secure the rotator assembly to the housing with six socket head cap screws. Tighten the screws in sequence until the cartridge is fully engaged into the housing to prevent misalignment and possible damage. Torque to 10 lbs•in.

4. To avoid losing the jack screws during normal operation, torque to 2-3 lbs•in (0.23-0.34 Nm).

Turbine Cartridge Service

This cartridge is a precision instrument and should be handled with care. The bearings are preloaded to 30 lbs. (13-6 Kg) and dynamically balanced.

Turbine bearing unit must be returned to Ransburg for rebuilding.

CAUTION

> Failure to observe the following cautions will result in diminished performance and premature motor failure.

NOTES:

- Never use any silicone compound in this system!
- Never use any lubrication on the bearings!
- Never use any solvent on the bearings!
- Never exert force on one race of a bearing assembly that may be transmitted to the other race through the bearings! Force and resistance must always be on the same race in order to prevent damage.
- Do not enlarge the nozzle passages during cleaning, as it will effect performance.
- Always observe the specified torque in tightening fasteners.
- Clean all parts thoroughly with an appropriate, clean solvent. Inspect them for wear or damage and replace as required.
- Check all flow passages for obstruction, particularly the nozzle plate. Clear as required.
- Discard o-rings and replace with new. Lightly lubricate o-rings with petroleum jelly before assembly. Fit parts with o-rings very carefully. They must not be allowed to distort, unseat, or break.

TROUBLESHOOTING GUIDE

General Problem	Cause	Solution
Fluctuating Pattern	1. Not enough back pressure on regulator	1. See regulator manual for diagnosis.
Light Coverage on Some Parts	1. Part hangers, hooks, are not clean	1. a. Clean hangers. b. Check ground continuity. (Must be less than 1 Megohm.)
Poor Transfer Efficiency	1. Low voltage 2. Disk RPM to high 3. Booth flow to high 4. Disk edge to part distance to great	1. Check disk voltage with high voltage probe. 2. Slow disk speed. 3. Reduce booth air flow. 4. Decrease conveyor loop diameter.
Low Current Readings	1. Dirty high voltage contacts	1. Clean and/or replace.
High Current Readings / Power Supply Overloads	1. Target distance to close 2. Conductive paint 3. Fairing dirty 4. High voltage cable break-down 5. Fluid tube pinholed to ground on conductive paint systems 6. Isolation mounting rod dirty or carbon tracked	1. Check target distance. Ideal target distance is 12-inches minimum. 2. Solventbase paint conductivity should be between .05 and 20 megohms on Ransburg Paint Test Meter. 3. Clean with nonpolar solvent. 4. Replace cable. 5. Check tubing routing for areas where fluid tube comes near a ground. 6. Clean with nonpolar solvent or replace.
Low Voltage	1. Power supply 2. Faulty high voltage switch or junction tank 3. High voltage cable	Use the following procedure to isolate problem: - Verify power supply output. Refer to power supply manual for procedure. - Remove the fairing and measure input voltage to the rotator assembly by removing the high voltage cable from the connector fitting and inserting it into the high voltage probe. If voltage is low, replace high voltage cable with a known good one and retest. - If voltage is still low, check for bad connections in the high voltage Junction or Switch Tank. Refer to procedures in the proper manual. - Reinstall the high voltage cable. Check voltage at the rotator housing.

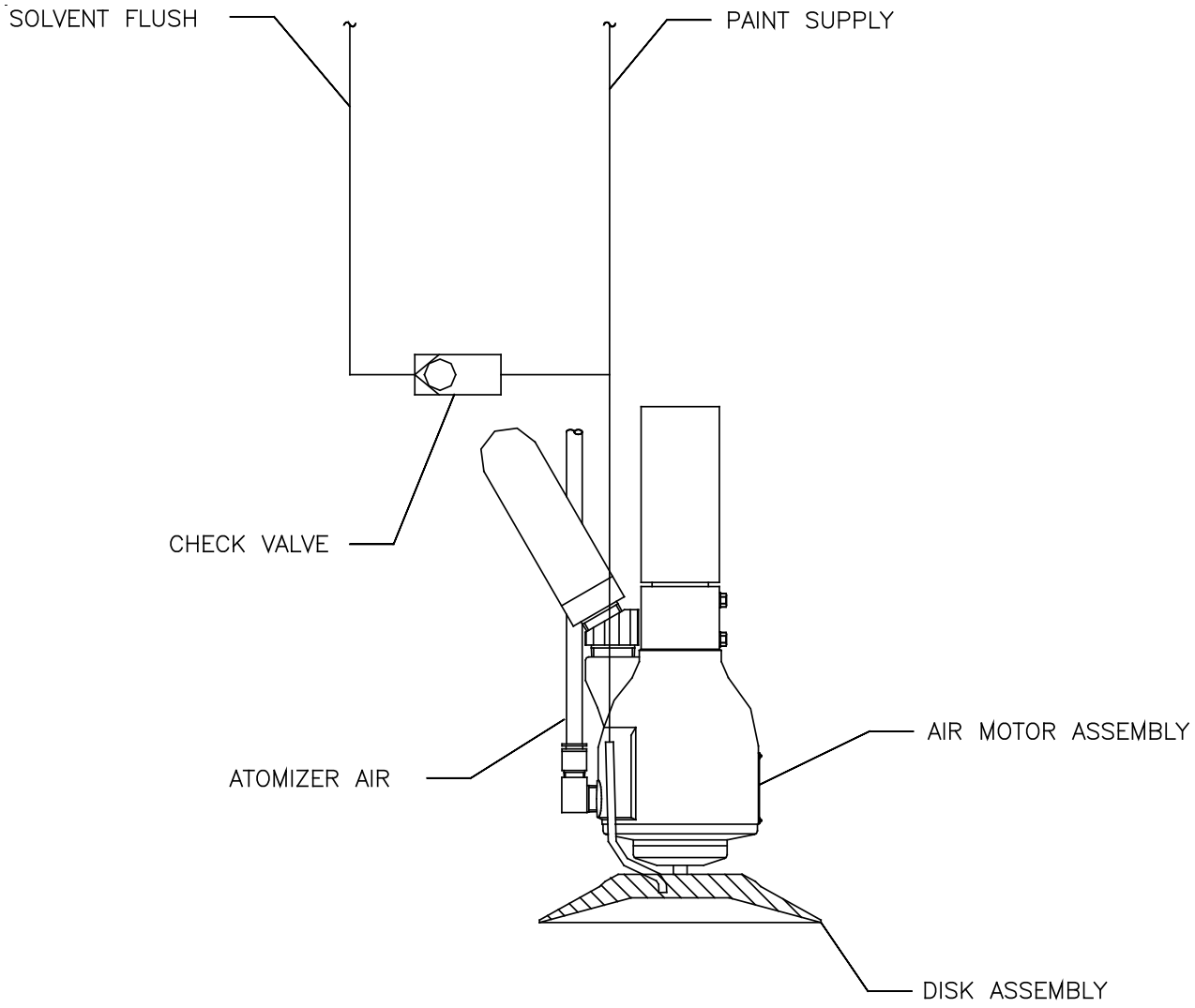


Figure 2: Typical No Valve Application Schematic

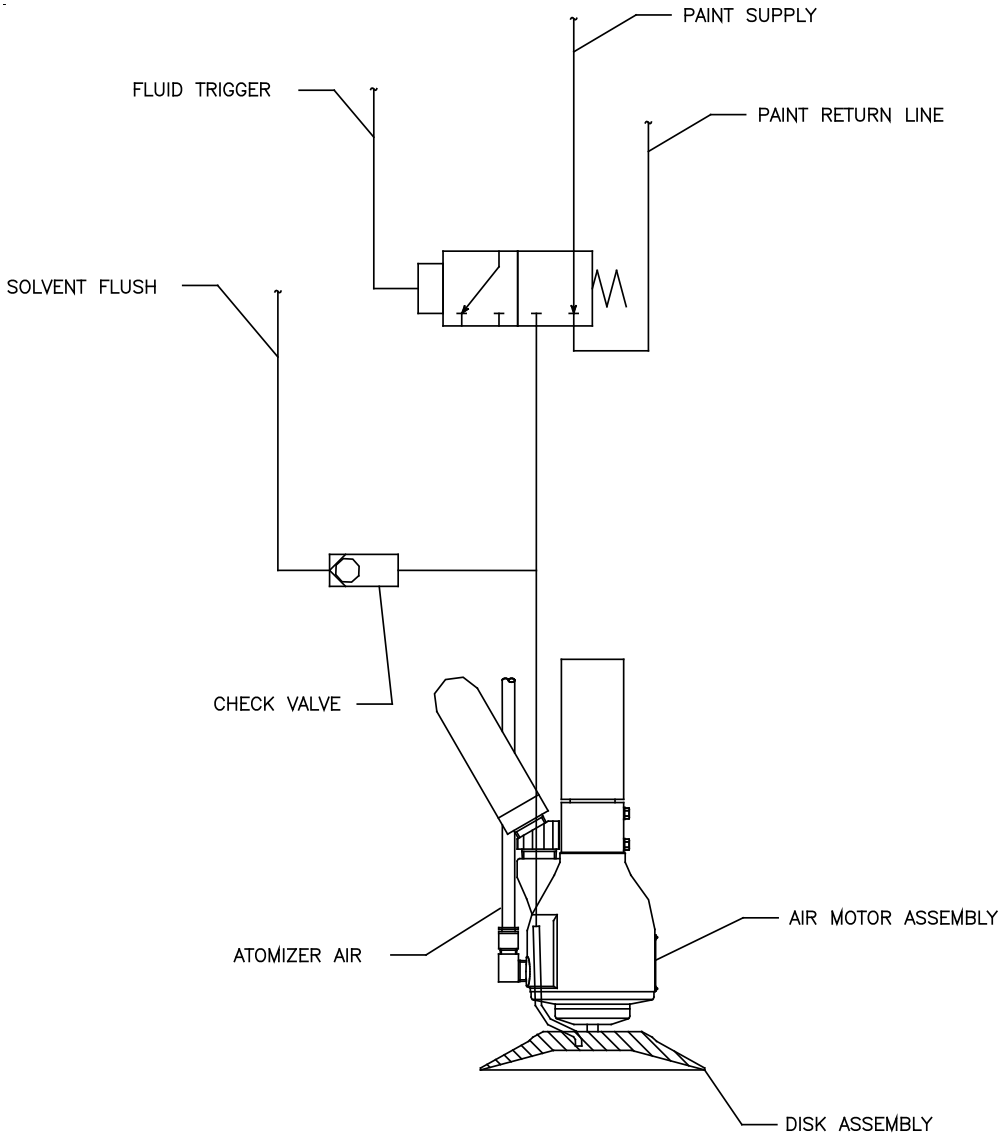


Figure 3: Typical 3-Way Valve Application Schematic

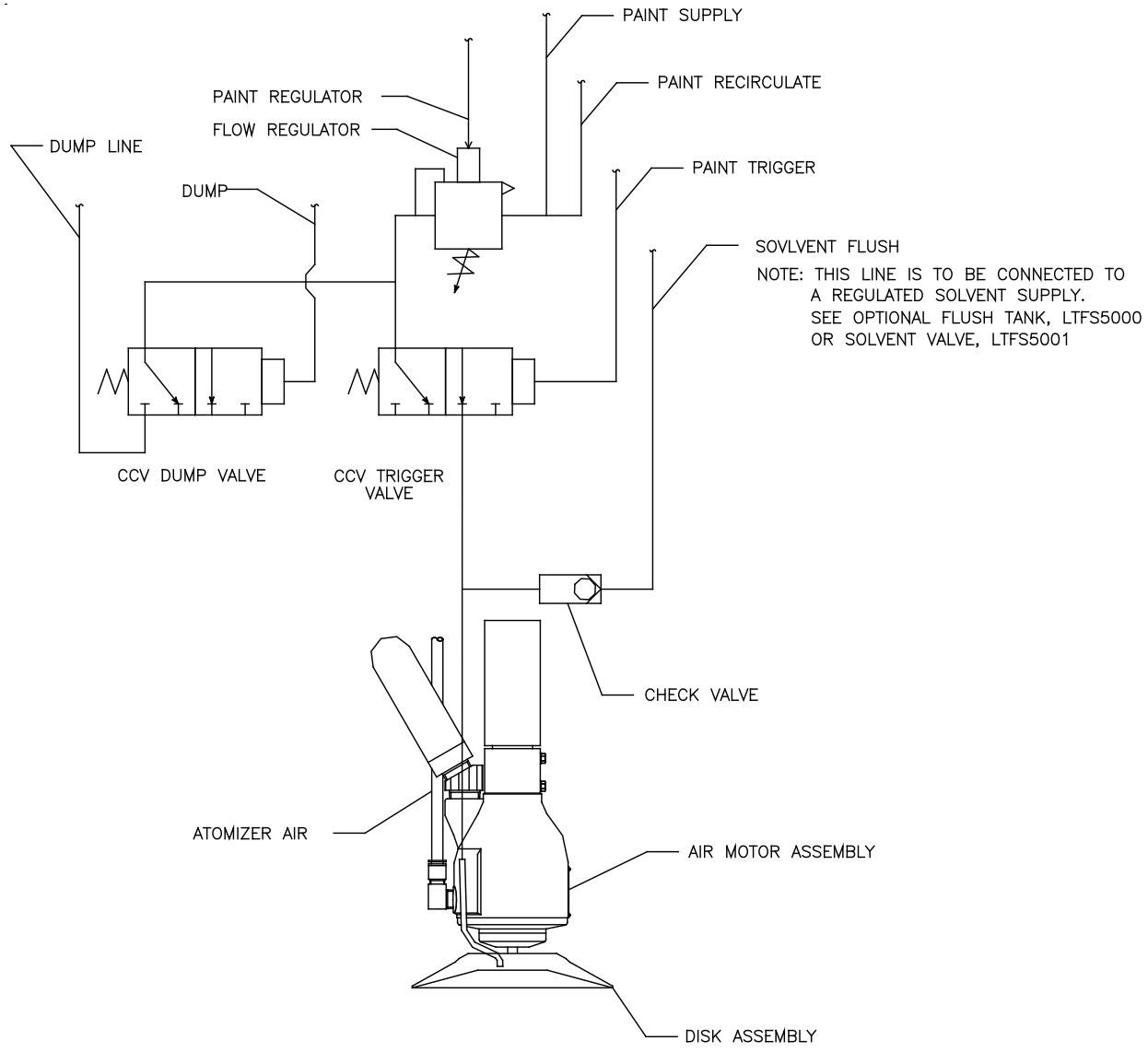


Figure 4: Typical Trigger and Dump Valve Application with DR-1 Regulator Schematic

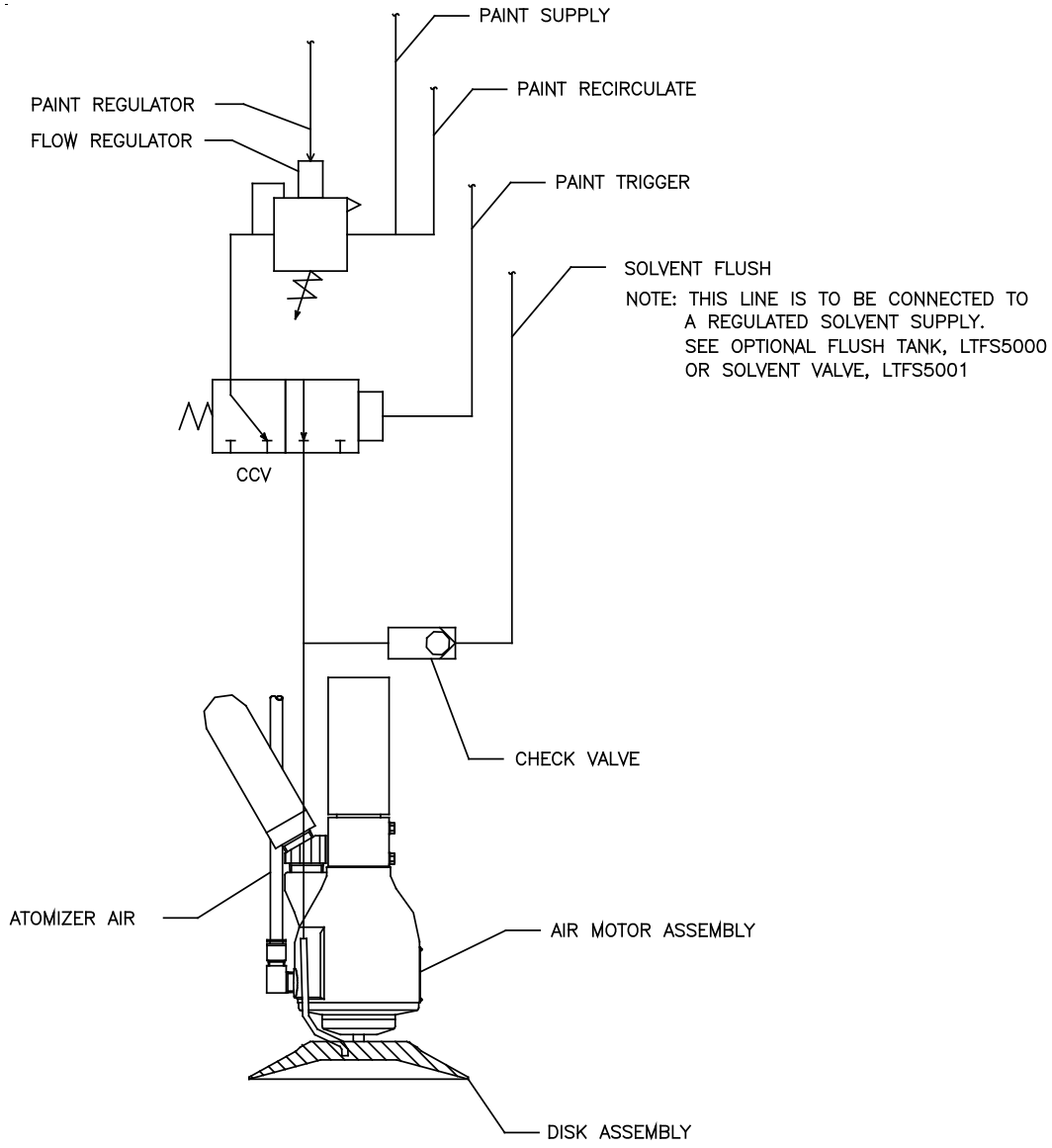


Figure 5: Typical Trigger Valve Only Application with DR-1 Regulator Schematic

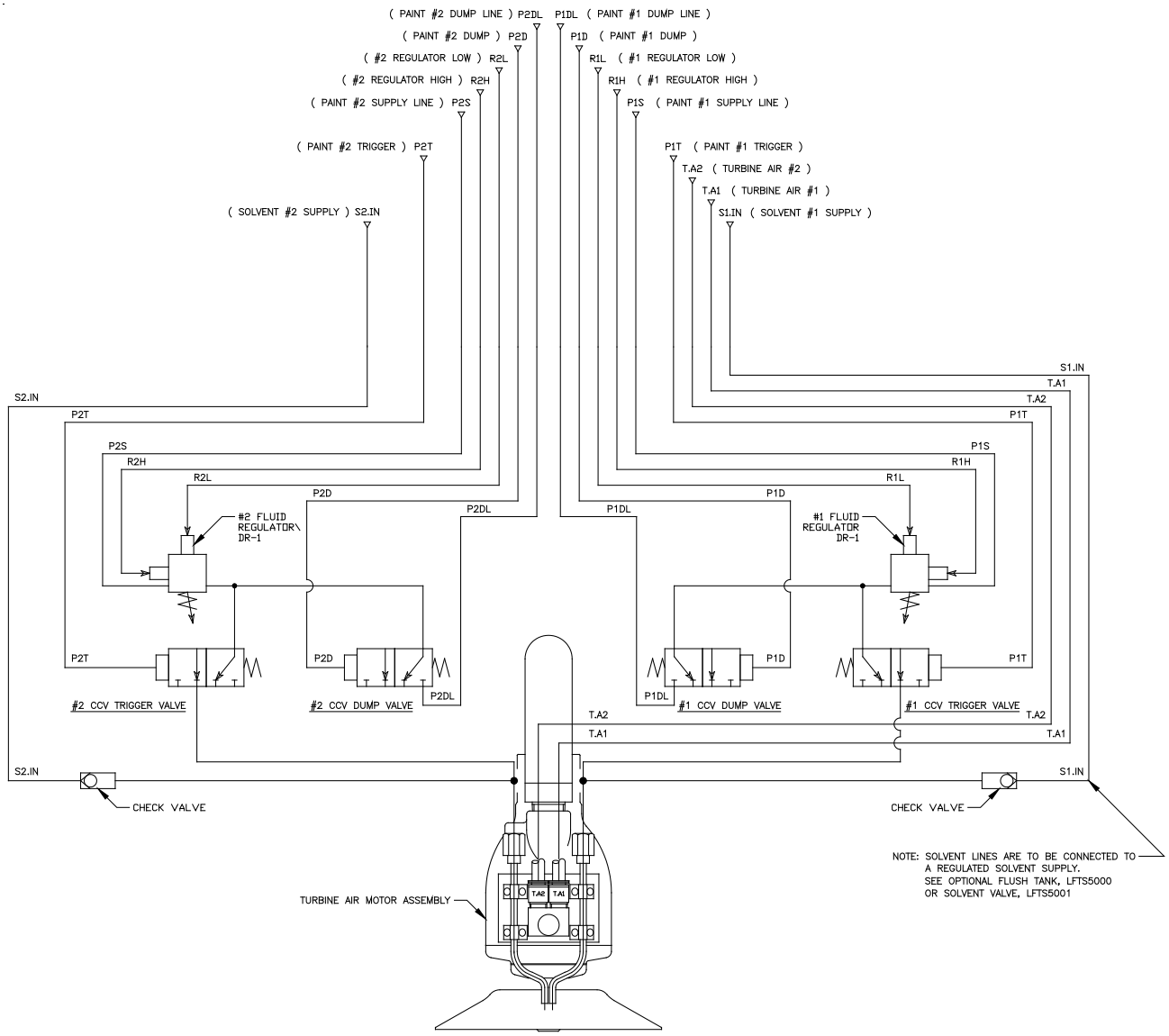

(PAINT #2 DUMP LINE) P2DL
P1DL (PAINT #1 DUMP LINE)
(PAINT #2 DUMP) P2D
P1D (PAINT #1 DUMP)
(#2 REGULATOR LOW) R2L
R1L (#1 REGULATOR LOW)
(#2 REGULATOR HIGH) R2H
R1H (#1 REGULATOR HIGH)
(PAINT #2 SUPPLY LINE) P2S
P1S (PAINT #1 SUPPLY LINE)
(PAINT #2 TRIGGER) P2T
P1T (PAINT #1 TRIGGER)
T.A2 (TURBINE AIR #2)
T.A1 (TURBINE AIR #1)
(SOLVENT #2 SUPPLY) S2.IN
S1.IN (SOLVENT #1 SUPPLY)
#2 FLUID REGULATOR DR-1
#1 FLUID REGULATOR DR-1
#2 CCV TRIGGER VALVE
#2 CCV DUMP VALVE
#1 CCV DUMP VALVE
#1 CCV TRIGGER VALVE
CHECK VALVE
CHECK VALVE
TURBINE AIR MOTOR ASSEMBLY
NOTE: SOLVENT LINES ARE TO BE CONNECTED TO A REGULATED SOLVENT SUPPLY. SEE OPTIONAL FLUSH TANK, LFTS5000 OR SOLVENT VALVE, LFTS5001

Figure 6: Typical Trigger and Dump Valve Application with 2 DR-1 Fluid Regulators Schematic

PARTS IDENTIFICATION

A11376 TURBODISK ASSEMBLY MODEL IDENTIFICATION

Turbodisk Assemblies are available with the various options as follows:

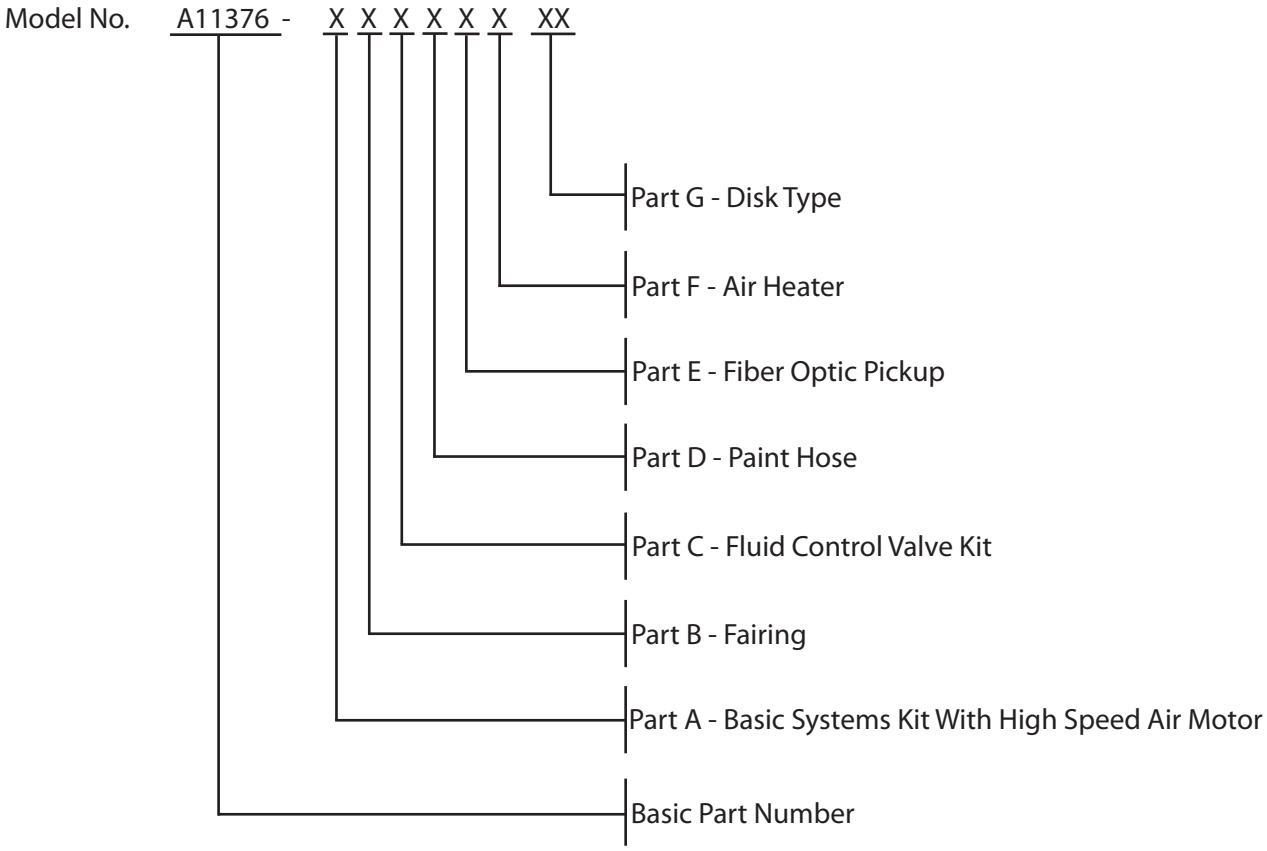

Model No.
A11376 - X X X X X X XX
Part G - Disk Type
Part F - Air Heater
Part E - Fiber Optic Pickup
Part D - Paint Hose
Part C - Fluid Control Valve Kit
Part B - Fairing
Part A - Basic Systems Kit With High Speed Air Motor
Basic Part Number

TABLE "A" - BASIC SYSTEMS KIT W/HIGH SPEED AIR MOTOR			
Dash #	Description	Kit Part #	Mounting Nut ▽9
1	Downfeed Clockwise - No Tilt	70988-01	19836-01
2	Downfeed Counter-Clockwise - Not Tilt	70988-02	19836-02
3	Upfeed Clockwise - No Tilt	70988-03	19836-03
4	Upfeed Counter-Clockwise - No Tilt	70988-04	19836-04
5	Downfeed Clockwise - No Tilt	70988-05	19836-05
6	Downfeed Counter-Clockwise - No Tilt, Dual Feed Tube	70988-06	19836-06
7	Upfeed Clockwise - Not Tilt, Dual Feed Tube	70988-07	19836-07
8	Upfeed Counter-Clockwise - No Tilt, Dual Feed Tube	70988-08	19836-08

TABLE "B" - FAIRING

Dash #	Description	Part #
0	None	--
2	Fairing	70158-02

TABLE "C" - FLUID CONTROL VALVE KIT

Dash #	Description	Kit Part #	DR-1 or High Flow Reference	
5	No Valves or Fluid Regulator	70975-05	70975-05	
6	3-Way Valve, No Fluid Regulator	70975-06	70975-06	
7	Trigger Valve with High Flow Fluid Regulator	70975-07	70171-04	6
8	Trigger & Dump Valve with High Flow Fluid Regulator	70975-08	70171-04	6
A	Trigger Valve with DR-1 Fluid Regulator, 1:2 Ratio	70975-09	74151-01	7
B	Trigger Valve with DR-1 Fluid Regulator, 1:4 Ratio	70975-09	74151-02	7
C	Trigger Valve with DR-1 Fluid Regulator, 1:6 Ratio	70975-09	74151-03	7
D	Trigger Valve with DR-1 Fluid Regulator, 1:8 Ratio	70975-09	74151-04	7
E	Trigger Valve with DR-1 Fluid Regulator, 1:10 Ratio	70975-09	74151-05	7
F	Trigger Valve with DR-1 Fluid Regulator, 1:3 Ratio	70975-09	74151-06	7
G	Trigger Valve with DR-1 Fluid Regulator, 1:1 Ratio	70975-09	74151-11	7
H	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:2 Ratio	70975-10	74151-01	7
J	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:4 Ratio	70975-10	74151-02	7
K	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:6 Ratio	70975-10	74151-03	7
M	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:8 Ratio	70975-10	74151-04	7
N	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:10 Ratio	70975-10	74151-05	7
P	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:3 Ratio	70975-10	74151-06	7
R	Trigger & Dump Valve with DR-1 Fluid Regulator, 1:1 Ratio	70975-10	74151-11	7
S	Trigger & Dump Valve with (2) DR-1 Fluid Regulator, 1:1 Ratio	70975-11	74151-11	7

TABLE "D" - HOSE FOR PAINT SYSTEM

Dash #	Description	Part #
0	None	--
4	3/8" OD	70977-04
5	1/2" OD	70977-05
6	1/4" OD	70977-06

TABLE "E" - FIBER OPTIC PICKUP

Dash #	Description	Part #
0	None	--
1	Fiber Optic Pickup	SMC-29

TABLE "F" - AIR HEATER

Dash #	Description	Part #
0	None	--
1	Air Heater Manifold Package With High Flow Regulator	78781-00
2	Regulator Assembly - No Heater	78170-00

TABLE "G" - DISK TYPE

Dash #	Description	Part #
00	None	--
01	Disk Assy., Serrated, 6", Aluminum, Not Anodized	20485-62
02	Disk Assy., Serrated, 6", Aluminum, Anodized	20485-65
03	Disk Assy., Serrated, 9", Aluminum, Not Anodized	20485-92
04	Disk Assy., Serrated, 9", Aluminum, Anodized	20485-95
05	Disk Assy., Serrated, 12", Aluminum, Not Anodized	20485-122
06	Disk Assy., Serrated, 12", Aluminum, Anodized	20485-125
07	Uni-Disk Assy., 6", Aluminum, Not Anodized	19830-06
08	Uni-Disk Assy., 8", Aluminum, Not Anodized	19830-08
09	Uni-Disk Assy., 10", Aluminum, Not Anodized	19830-10
10	Uni-Disk Assy., 12", Aluminum, Not Anodized	19830-12

* PARTS LIST BULLET DEFINITION TABLE

9 (1) Disk Mounting Nut (See "Table A") is included with this assembly. When mounting disk (not included), torque mounting nut to 50-60 lbs•in (5.65-6.75 Nm). (Recommended: 3/8" hex bit socket with square drive torque wrench.)

7 DR-1 Fluid Regulator, 74151-XX can only be used with Fluid Control Valve Kits 70975-09 and 70975-10 as shown in "Table C".

General Application Guideline: Use DR-1 Regulator for paint flow rates from 25 to 1500 cc/min.

6 High Flow Fluid Regulator, 70171-04, can only be used with Fluid Control Valve Kits 70975-07 and 70975-08 as shown in "Table C".

General Application Guideline: Use High Flow Regulator for paint flow rates above 750 cc/min.

70988 BASIC SYSTEMS KIT

70988-01 DOWNFEED, CLOCKWISE		
Part #	Description	Qty
78175-02	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-01	Feed Tube Kit	1
19850-00	Disk Puller Assembly	1

70988-02 DOWNFEED, COUNTER-CLOCKWISE 1		
Part #	Description	Qty
78175-12	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-01	Feed Tube Kit	1
19850-00	Disk Puller Assembly	1

70988-03 UPFEED, CLOCKWISE 1		
Part #	Description	Qty
78175-02	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-02	Feed Tube Kit	1
19850-00	Disk Puller Assembly	1

70988-04 UPFEED, COUNTER-CLOCKWISE 1		
Part #	Description	Qty
78175-12	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-03	Feed Tube Kit	1
19850-00	Disk Puller Assembly	1

1 Special Order Only.

70988 BASIC SYSTEMS KIT (Cont.)

70988-05 DOWNFEED, CLOCKWISE DUAL FEED TUBE

Part #	Description	Qty
78175-02	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-01	Feed Tube Kit	2
19850-00	Disk Puller Assembly	1

70988-06 DOWNFEED, COUNTER-CLOCKWISE DUAL FEED TUBE [1]

Part #	Description	Qty
78175-12	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-01	Feed Tube Kit	2
19850-00	Disk Puller Assembly	1

70988-07 UPFEED, CLOCKWISE DUAL FEED TUBE [1]

Part #	Description	Qty
78175-02	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-02	Feed Tube Kit	2
19850-00	Disk Puller Assembly	1

70988-08 UPFEED, COUNTER-CLOCKWISE DUAL FEED TUBE [1]

Part #	Description	Qty
78175-12	Air Motor, High Speed	1
70973-01	Basic Mounting Parts Kit	1
70976-03	Feed Tube Kit	2
19850-00	Disk Puller Assembly	1

[1] Special Order Only.

NOTES

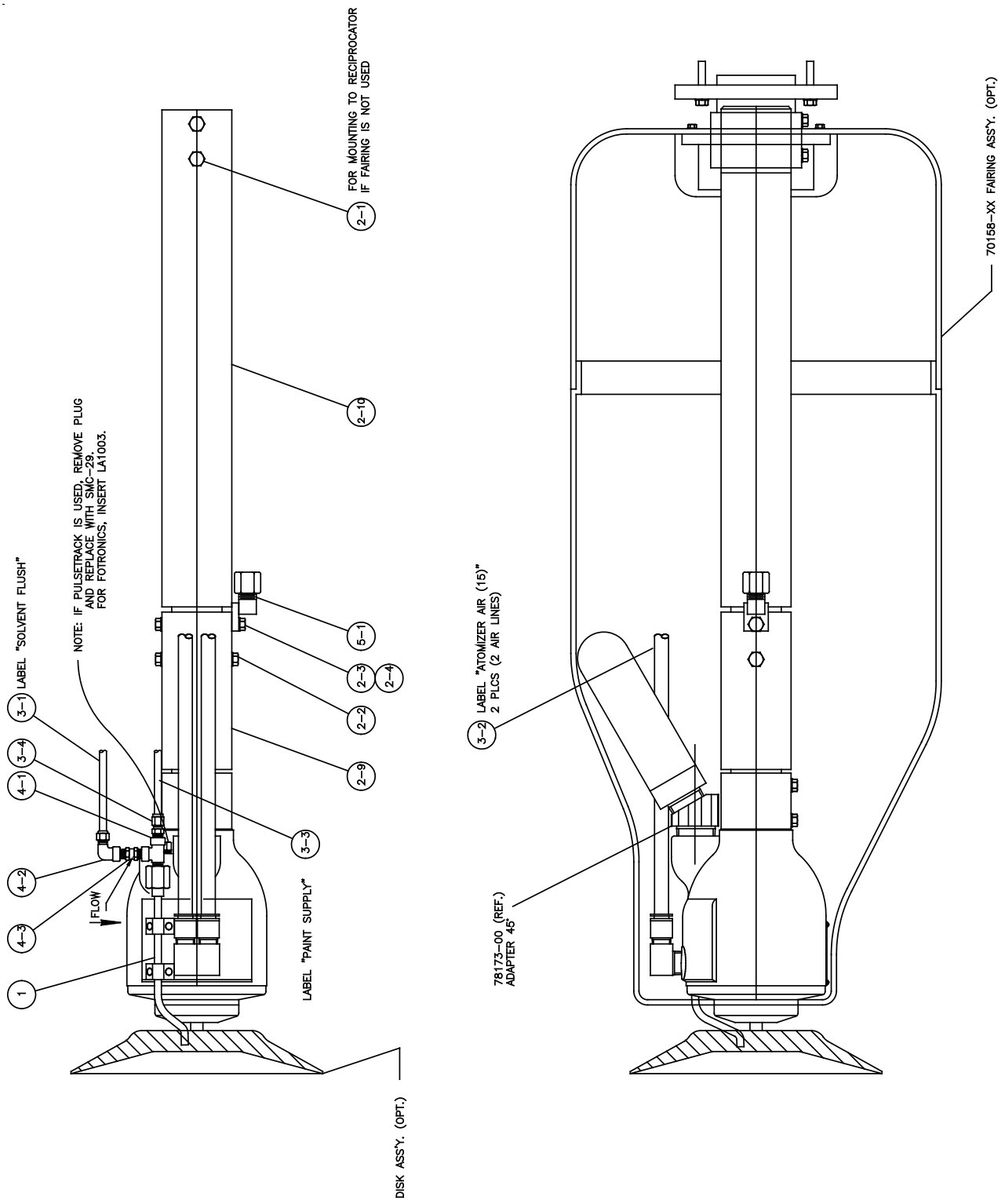


Figure 7: 70990-05 Turbodisk Assembly, No Valves

70990-05 TURBODISK ASSEMBLY, NO VALVES - PARTS LIST (Figure 7)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70989-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same as	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	41-FTC-1002	Fitting, Connector, 3/8" T X 1/4" NPT	4	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
These parts are supplied with Kit 70975-05, No Valve Kit				
4-1	LSFI0004-01	Street Tee, 1/4" NPT, SS	1	
4-2	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT Female, SS	1	
4-3	SSV-809	Check Valve, 1/4" NPT, Male	1	
4-4	LSFI0018-01	Ferrule Kit, 1/2" Nylon (Not Shown)	1	

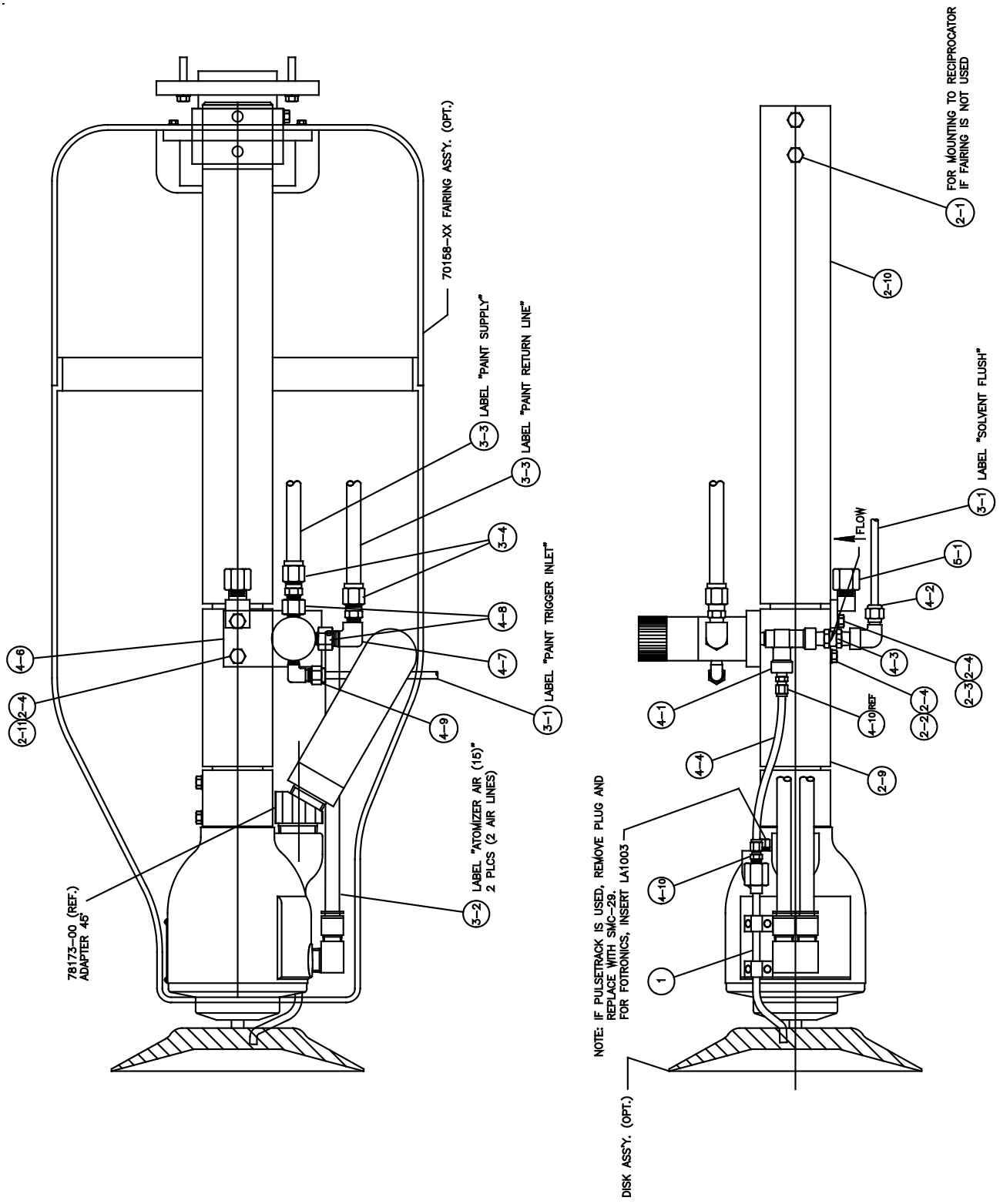


Figure 8: 70990-06 Turbodisk Assembly, 3-Way Valves

70990-06 TURBODISK ASSEMBLY, 3-WAY VALVES - PARTS LIST (Figure 8)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	41-FTC-1002	Fitting, Connector, 3/8" T X 1/4" NPT	4	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
These parts are supplied with Kit 70975-05, 3-Way Valve Kit				
4-1	LSFI0004-01	Street Tee, 1/4" NPT, SS	1	
4-2	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT Female, SS	1	
4-3	SSV-809	Check Valve, 1/4" NPT, SS	1	
4-4	55994-23	Tubing, FEP, .156" ID X .25" OD	5'	
4-6	18283-02	Valve Assembly, 3-Way	1	
4-7	LSFI0009-01	Elbow, Street, 1/4" NPT, SS	1	
4-8	SSP-39	Reducer, 1/8" NPT, Male X 1/4" NPT, Female, SS	2	
4-9	SSP-6427	Elbow, 1/4" OD Tube X 1/8" NPT, Brass	1	
4-10	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	2	
4-11	8156-48F	Screw, 5/16-32 X 1-1/4" Lg., Hex Head	2	
4-12	7734-07	L Washer, 5/16"	2	
4-13	17366-00	Repair Kit, 3-Way Valve (Not Shown)	1	
4-14	LSFI0018-01	Ferrule Kit (Not Shown)	1	

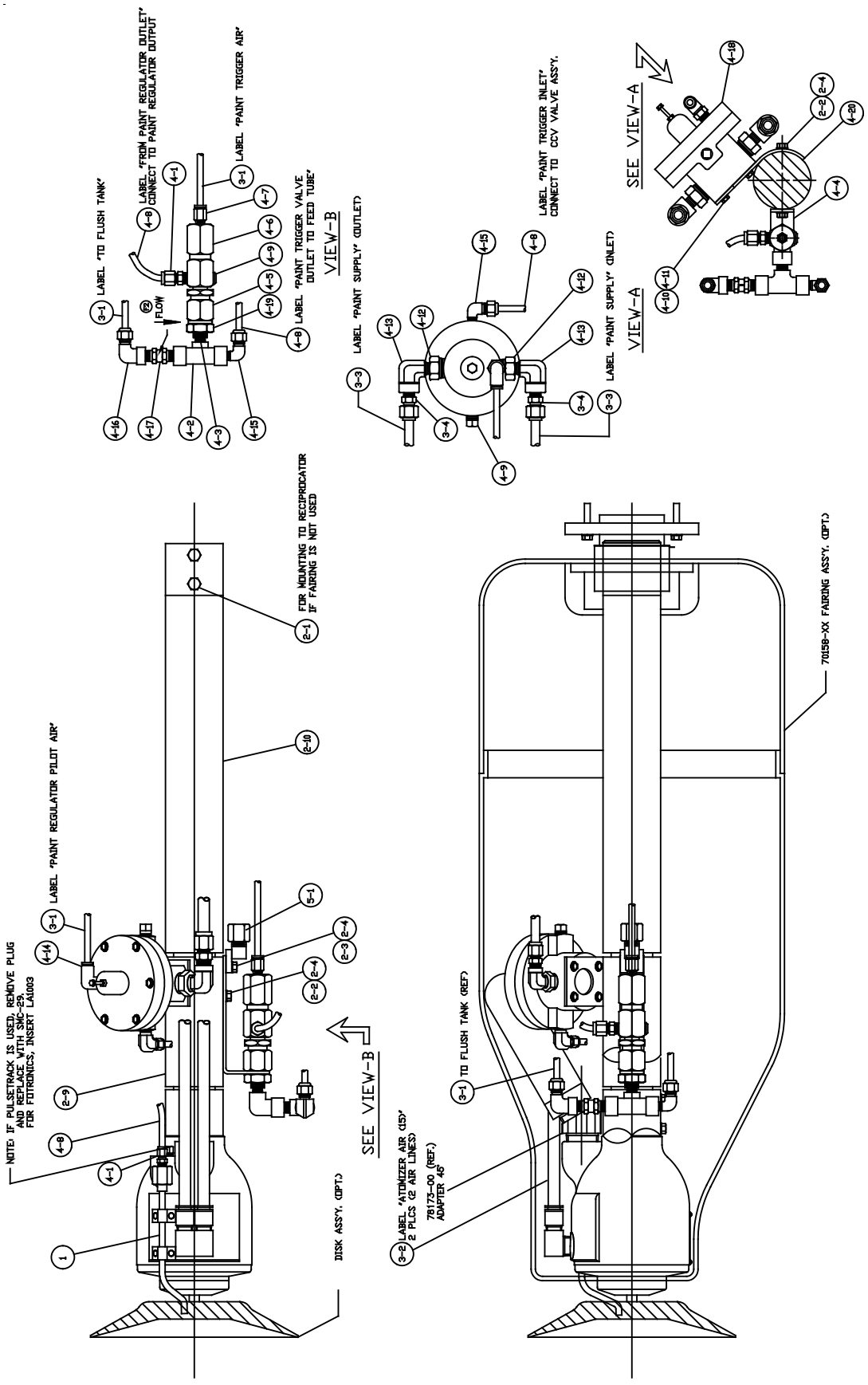

LABEL "FROM PAINT REGULATOR OUTLET" CONNECT TO PAINT REGULATOR OUTPUT
LABEL "PAINT TRIGGER AIR"
LABEL "TO FLUSH TANK"
FLOW
LABEL "PAINT TRIGGER VALVE OUTLET TO FEED TUBE"
VIEW-B
LABEL "PAINT SUPPLY" (OUTLET)
LABEL "PAINT TRIGGER INLET" CONNECT TO CCV VALVE ASS'Y.
LABEL "PAINT SUPPLY" (INLET)
VIEW-A
SEE VIEW-A
FOR MOUNTING TO RECIPROCATOR IF FAIRING IS NOT USED
LABEL "PAINT REGULATOR PILOT AIR"
NOTE: IF PULSETRACK IS USED, REMOVE PLUG AND REPLACE WITH SMC-29, FOR FOTRONICS, INSERT LA1003
SEE VIEW-B
DISK ASS'Y. (OPT.)
70158-XX FAIRING ASS'Y. (OPT.)
TO FLUSH TANK (REF.)
LABEL "ATOMIZER AIR (15)" 2 PLCS (2 AIR LINES)
78173-00 (REF.) ADAPTER 45°

Figure 9: 70990-07 Turbodisk Assembly, Trigger Valve Only

70990-07 TURBODISK ASSEMBLY, TRIGGER VALVE ONLY - PARTS LIST (Figure 9)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID 100'		Supplied with Kit 70977-05 only
3-4	41-FTC-1002	Fitting, Connector, 3/8" T X 1/4" NPT	4	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
These parts are supplied with Kit 70975-07 (High Flow) of 70975-09 (Low Flow) Trigger Valve W/Regulator or Regulator Ready * Indicates supplied W/70975-07 Only. ** Indicates supplied W/70975-09 Only				
4-1	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	1	
4-2	LSFI0038-00	Elbow, SST, 1/4" NPT(F) X 1/8" NPT(M)	1	
4-3	76462-00	Fitting, SST, 1/4" NPT, Male, Branch Tee	1	
4-4	LRPM0105	Bracket	1	
4-5	CCV-12-SS	Valve Adapter	1	
4-6	CCV-403-SS	Trigger Valve Assembly	1	
4-7	SSP-6054	Connector, 1/4" OD Tube X 1/8" NPT, Male, Brass	1	3
4-8	55994-23	Tubing, FEP, .250" OD X .156" ID	5'	3
4-8	55994-24	Tubing, FEP, .250 OD X .126 ID	5'	
4-9	SSP-1421	Plug, Hex Socket, 1/4" NPT	1	
4-10	7958-56C	Screw, 1/4-20 X 1-3/4" Lg., Hex Head	2	
4-11	7734-06	L Washer, 1/4"	4	
4-12	78004-00	Bushing, 1/2" NPT Male X 1/4" NPT Female, SS *	2	
4-13	78006-00	Elbow, Street, 1/4" NPT, SS	2	
4-14	SSP-6439	Elbow, Swivel, Male, 1/4" OD X 1/4" NPT, Brass	1	
4-15	LSFI0007-01	Elbow, 1/4" OD Tube X 1/4" NPT Male, SS *	2	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

(Continued On Next Page)

70990-07 TURBODISK ASSEMBLY, TRIGGER VALVE ONLY - PARTS LIST (Continued) (Figure 9)

Item #	Part #	Description	Qty	Notes
These parts are supplied with Kit 70975-07 (High Flow) of 70975-09 (Low Flow) Trigger Valve W/Regulator or Regulator Ready * Indicates supplied W/70975-07 Only. ** Indicates supplied W/70975-09 Only				
4-17	SSV-809	Check Valve, 1/4" NPT	1	
4-18	70171-04	Flow Regulator Assembly *	1	
4-18	74151-XX	Flow Regulator, DR-1 (Not Shown) **	1	
4-18	70589-05	Fitting, 1/4" OD Tube, Special (Not Shown) **	1	
4-18	8212-32F	Screw, Regulator Mounting (Not Shown) **	2	
4-18	7787-02	Adapter, 1/4" NPSF to 1/4" NPTF, Carbon Steel ** (Not Shown)	1	
4-18	LSFI0004-04	Tee, Street, 1/4" NPT (Not Shown) **	1	
4-19	SSF-8125	Hex Jam Nut	1	
4-20	20810-00	Bracket, Regulator *	1	
4-20	LSMM0025	Bracket, DR-1 (Not Shown) **	1	
4-21	LSFI0018-01	Ferrule Kit (Not Shown)	1	
4-22	AU-81-07	Flow Regulator Service Manual - 70171-04 (Not Shown) *	1	
4-22	LN-9223-00.9	DR-1 Fluid Regulator Service Manual - 74151-XX (Not Shown) **	1	
4-23	KK-4841	Repair Kit, CCV-403-SS (Not Shown)	1	
4-24	LN-9100-00	CCV-403-SS Service Manual (Not Shown)	1	
4-25	CCV-7	Valve Tool (Not Shown)	1	

NOTES

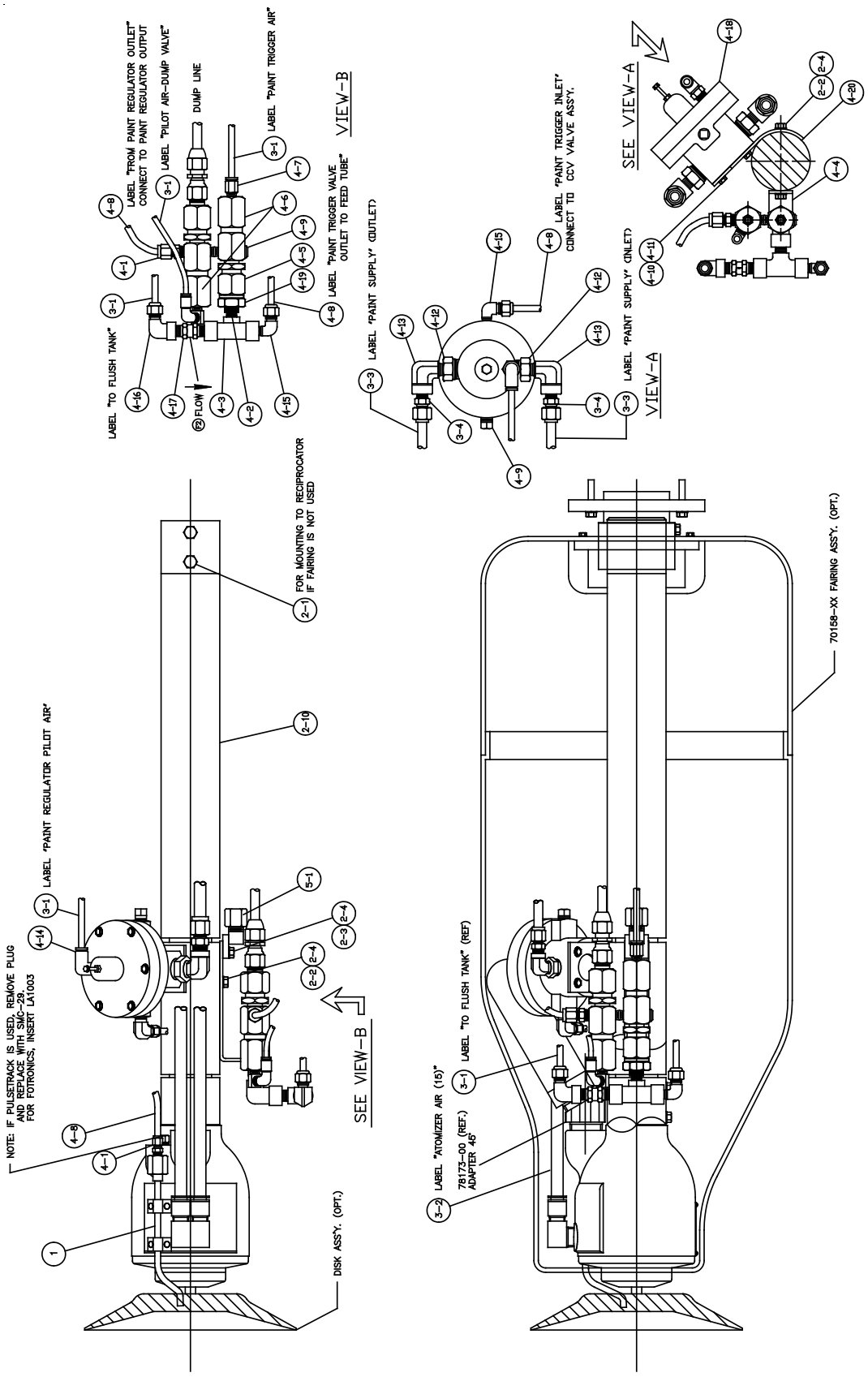

LABEL "FROM PAINT REGULATOR OUTLET" CONNECT TO PAINT REGULATOR OUTPUT
LABEL "PILOT AIR-DUMP VALVE"
DUMP LINE
LABEL "PAINT TRIGGER AIR"
LABEL "PAINT TRIGGER VALVE OUTLET TO FEED TUBE"
VIEW-B
LABEL "TO FLUSH TANK"
FLOW
LABEL "PAINT SUPPLY" (OUTLET)
LABEL "PAINT TRIGGER INLET" CONNECT TO CCV VALVE ASS'Y.
SEE VIEW-A
VIEW-A
LABEL "PAINT SUPPLY" (INLET)
FOR MOUNTING TO RECIPROCATOR IF FAIRING IS NOT USED
LABEL "PAINT REGULATOR PILOT AIR"
NOTE: IF PULSETRACK IS USED, REMOVE PLUG AND REPLACE WITH SMC-29, FOR FOTRONICS, INSERT LA1003
SEE VIEW-B
DISK ASS'Y. (OPT.)
70158-XX FAIRING ASS'Y. (OPT.)
LABEL "TO FLUSH TANK" (REF)
LABEL "ATOMIZER AIR (15)"
78173-00 (REF.) ADAPTER 45°

Figure 10: 70990-08 Turbodisk Assembly, Trigger and Dump Valve

70990-08 TURBODISK ASSEMBLY, TRIGGER AND DUMP VALVE - PARTS LIST (Figure 10)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same as	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	41-FTC-1002	Fitting, Connector, 3/8" T X 1/4" NPT	4	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
These parts are supplied with Kit 70975-08 (High Flow) or 70975-10 (Low Flow) Trigger and Dump Valve W/Regulator Ready * Indicates supplied w/70975-08 only. ** Indicates supplied w/70975-10 only.				
4-1	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	1	
4-2	LSFI0038-00	Elbow, SST, 1/4" NPT(F) X 1/8" NPT(M)	1	
4-3	76462-00	Fitting, SST, 1/4" NPT, Male, Branch Tee	1	
4-4	LRPM0105	Bracket	1	
4-5	CCV-12-SS	Valve Adapter	1	3
4-6	LDSK4000	2-Valve Assembly, Trigger and Dump	1	3
4-7	SSP-6054	Connector, 1/4" OD Tube X 1/8" NPT, Male, Brass	1	
4-8	55994-23	Tubing, FEP, .250" OD X .156" ID	5'	
4-8	55994-24	Tubing, FEP, .250 OD X .126 ID	5'	
4-9	SSP-1421	Plug, Hex Socket, 1/4" NPT	1	
4-10	7958-56C	Screw, 1/4-20 X 1-3/4" Lg., Hex Head	2	
4-11	7734-06	L Washer, 1/4"	4	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

(Continued On Next Page)

70990-08 TURBODISK ASSEMBLY, TRIGGER AND DUMP VALVE - PARTS LIST (Cont.) (Figure 10)

Item #	Part #	Description	Qty	Notes
These parts are supplied with Kit 70975-08 (High Flow) or 70975-10 (Low Flow) Trigger and Dump Valve W/Regulator or Regulator Ready. * Indicates supplied w/70975-08 only. ** Indicates supplied w/70975-10 only.				
4-13	78006-00	Elbow, Street, 1/4" NPT, SS	2	
4-14	SSP-6439	Elbow, Swivel, Male, 1/4" OD X 1/4" NPT, Brass *	1	
4-15	LSFI0007-01	Elbow, 1/4" OD Tube X 1/4" NPT Male, SS	2	
4-16	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT Female, SS	1	
4-17	SSV-809	Check Valve, 1/4" NPT	1	
4-18	70171-04	Flow Regulator Assembly (Reference) *	1	
4-18	74151-XX	Dlow Regulator, DR-1 (Not Shown) **	1	
4-18	70589-05	Fitting, 1/4" OD Tube, Special (Not shown) **	1	
4-18	8212-32F	Screw, Regulator Mounting (Not Shown) **	2	
4-18	7787-02	Adapter, 1/4" NPSF to 1/4" NPTF,	1	
		Carbon Steel (Not Shown) **		
4-18	LSFI0004-01	Tee, Street, 1/4" NPT (Not Shown) **	1	
4-19	SSF-8125	Hex Jam Nut	1	
4-20	20810-00	Bracket, Regulator *	1	
4-20	LSMM0025	Bracket, DR-1 **	1	
4-21	LSFI0018-01	Ferrule Kit (Not Shown)	1	
4-22	AU-81-07	Flow Regulator Service Manual, 70174-04 (Not Shown) *	1	
4-23	KK-4841	Repair Kit, CCV-403-SS (Not Shown)	1	
4-24	LN-9100-00	CCV-403-SS Service Manual (Not Shown)	1	
4-25	CCV-7	Valve Tool (Not Shown)	1	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

NOTES

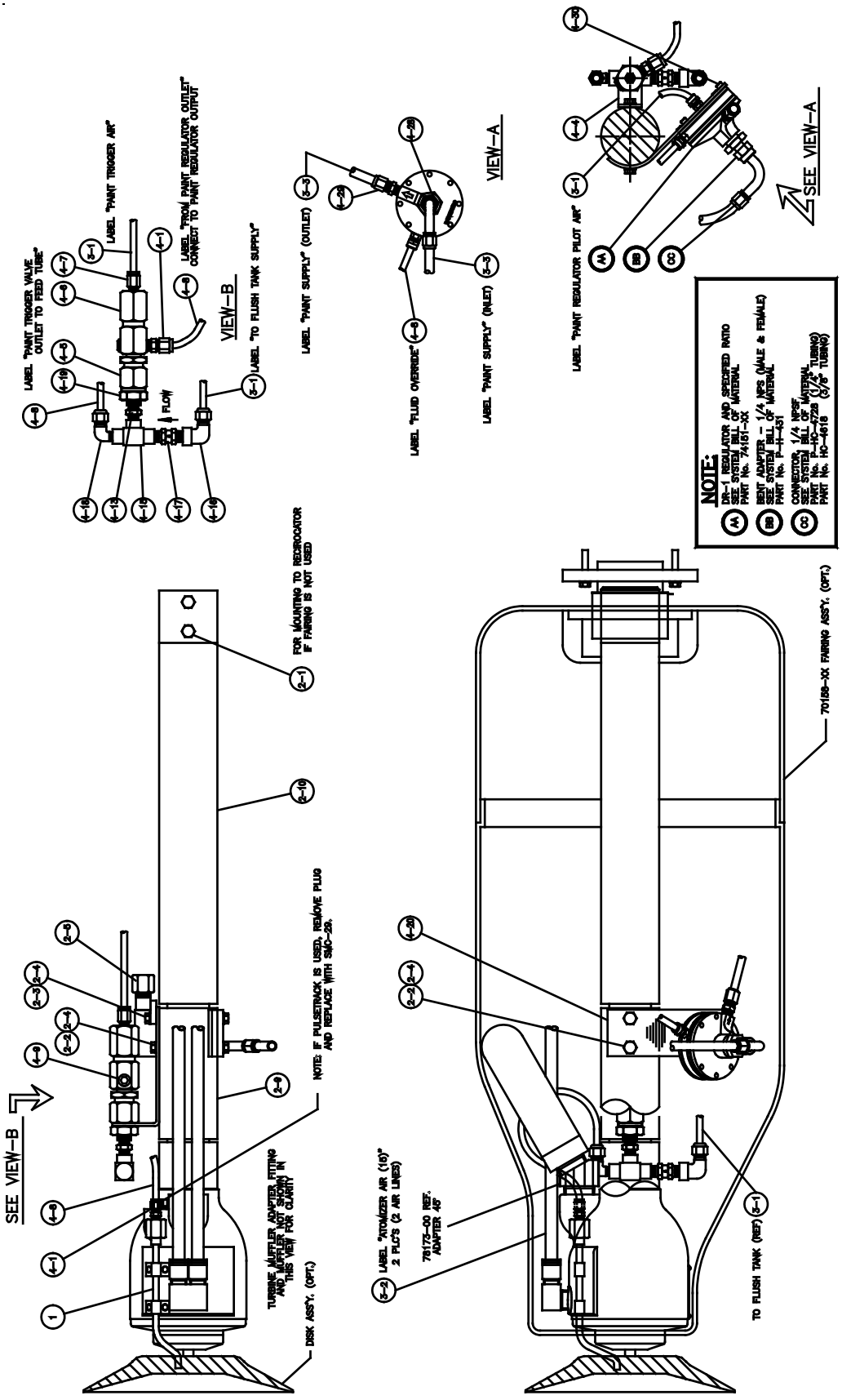

VIEW–B
VIEW–A
SEE VIEW–A
SEE VIEW–B
NOTE:
LABEL "PAINT TRIGGER AIR"
LABEL "FROM PAINT REGULATOR OUTLET" CONNECT TO PAINT REGULATOR OUTPUT
LABEL "PAINT TRIGGER VALVE OUTLET TO FEED TUBE"
LABEL "TO FLUSH TANK SUPPLY"
LABEL "PAINT SUPPLY" (OUTLET)
LABEL "FLUID OVERRIDE"
LABEL "PAINT SUPPLY" (INLET)
LABEL "PAINT REGULATOR PILOT AIR"
FLOW
FOR MOUNTING TO RECIPROCATOR IF FAIRING IS NOT USED
NOTE: IF PULSETRACK IS USED, REMOVE PLUG AND REPLACE WITH SWC–29.
TURBINE MUFFLER ADAPTER FITTING AND MUFFLER NOT SHOWN IN THIS VIEW FOR CLARITY
DISK ASSY. (OPT.)
LABEL "ATOMIZER AIR (10)" 2 PLC'S (2 AIR LINES)
78173–00 REF. ADAPTER 45°
TO FLUSH TANK (REF)
70159–XX FAIRING ASSY. (OPT.)
DR–1 REGULATOR AND SPECIFIED RATIO
SEE SYSTEM BILL OF MATERIAL
PART No. 74161–XX
BENT ADAPTER – 1/4 NPS (MALE & FEMALE)
SEE SYSTEM BILL OF MATERIAL
PART No. P–H–431
CONNECTION, 1/4 NPSF
SEE SYSTEM BILL OF MATERIAL
PART No. HC–4518
(1/4" TUBING)
(3/8" TUBING)

Figure 11: 70990-09 Turbodisk Assembly, Trigger Valve Only W/DR-1 Regulator

70990-09 TURBODISK ASSEMBLY, TRIGGER VALVE ONLY W/DR-1 REGULATOR - PARTS LIST (Figure 11)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-5	17274-00	High Voltage Connector Assembly	1	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-12	3923-02	Spiral Wrap, 1/2" (Not Shown)	25'	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same as	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	78006-00	Elbow, 3/8" OD Tube X 1/4" NPT	2	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
3-5	41-FTC-1002	Connector, Straight, 3/8" OD Tube X 1/4" NPT	4	
These parts are supplied with Kit 70975-09 Trigger Valve Kit				
4-1	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	1	
4-4	LRPM0105	Bracket	1	
4-5	CCV-12-SS	Valve Adapter	1	
4-6	CCV-403-SS	Trigger Valve Assembly	1	
4-7	SSP-6054	Connector, 1/4" OD Tube X 1/8" NPT, Male, Brass	1	
4-8	55994-28	Tubing, FEP, .188" ID X .250" OD	5'	
4-9	SSP-1421	Plug, Hex Socket, 1/4" NPT	1	
4-13	LSFI0038-00	Elbow, Street, Reducing,	2	
		1/8" NPTM X 1/4" NPTF, SS		
4-14	SSP-6439	Elbow, Swivel, Male, 1/4" OD X 1/4" NPT, Brass	1	
4-15	76462-00	Service Tee, NI, 1/4"	1	
4-16	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT,Female, SS	1	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

(Continued On Next Page)

70990-09 TURBODISK ASSEMBLY, TRIGGER VALVE ONLY W/DR-1 REGULATOR - PARTS LIST (Cont.) (Figure 11)

Item #	Part #	Description	Qty	Notes
These parts are supplied with Kit 70975-09 Trigger Valve Kit				
4-18	LSFI0007-01	Elbow, Male, SS	1	
4-19	SSF-8125	Hex Jam Nut	1	
4-20	LSMM0025-00	Bracket, Regulator	1	
4-21	LSFI0018-01	Ferrule, Kit (Not Shown)	1	
4-22	LN-9223-00.9	DR-1 Fluid Regulator Service Manual (Not Shown)	1	
4-23	KK-4841	Repair Kit, CCV-403-SS (Not Shown)	1	
4-24	LN-9100-00	CCV-302-SS Service Manual	1	
4-25	CCV-7	Valve Tool (Not Shown)	1	
4-26	55994-23	Tubing, .156" ID X .253" OD	5'	3
4-27	55994-24	Tubing, 1/4" OD X 1/8" ID	5'	3
4-28	7787-02	Adapter, 1/4" NPSF to NPTF, Carbon Steel	1	
4-29	70589-05	Fitting, Paint, .250" Dia.	1	
4-30	8212-32F	Screw, Cap, Hex Socket, #10-32	2	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

NOTES

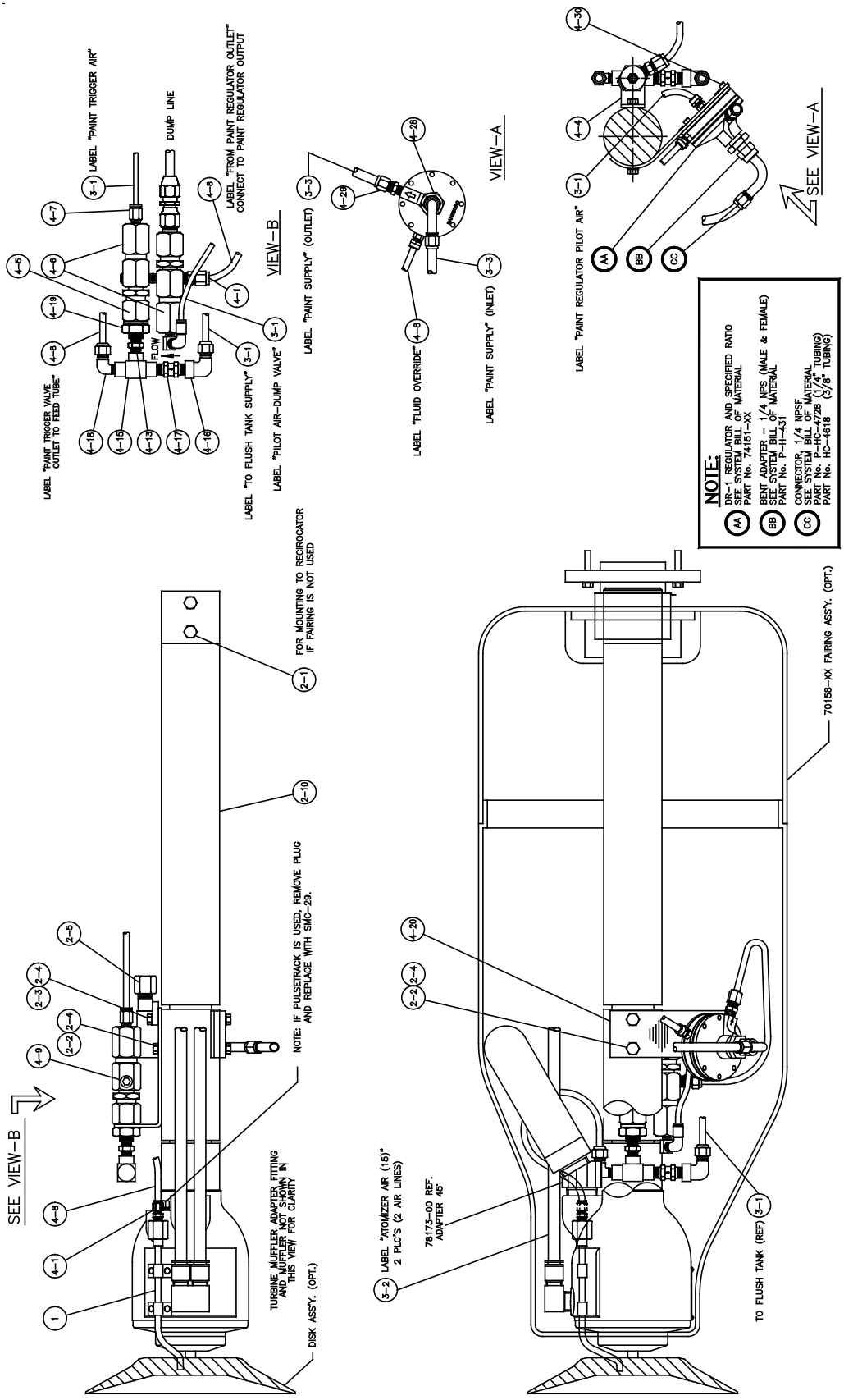

LABEL "PAINT TRIGGER AIR"
DUMP LINE
LABEL "FROM PAINT REGULATOR OUTLET" CONNECT TO PAINT REGULATOR OUTPUT
FLOW
LABEL "PAINT TRIGGER VALVE OUTLET TO FEED TUBE"
LABEL "TO FLUSH TANK SUPPLY"
LABEL "PILOT AIR-DUMP VALVE"
VIEW-B
LABEL "PAINT SUPPLY" (OUTLET)
LABEL "FLUID OVERRIDE"
LABEL "PAINT SUPPLY" (INLET)
VIEW-A
LABEL "PAINT REGULATOR PILOT AIR"
SEE VIEW-A
NOTE:
DR-1 REGULATOR AND SPECIFIED RATIO SEE SYSTEM BILL OF MATERIAL PART No. 74151-XX
BENT ADAPTER - 1/4 NPS (MALE & FEMALE) SEE SYSTEM BILL OF MATERIAL PART No. P-H-431
CONNECTOR, 1/4 NPSF SEE SYSTEM BILL OF MATERIAL PART No. P-HC-4728 (1/4" TUBING) PART No. HC-4618 (3/8" TUBING)
FOR MOUNTING TO RECIROCATOR IF FAIRING IS NOT USED
NOTE: IF PULSETRACK IS USED, REMOVE PLUG AND REPLACE WITH SMC-29.
SEE VIEW-B
TURBINE MUFFLER ADAPTER FITTING AND MUFFLER NOT SHOWN IN THIS VIEW FOR CLARITY
DISK ASS'Y. (OPT.)
70188-XX FAIRING ASS'Y. (OPT.)
LABEL "ATOMIZER AIR (15)" 2 PLC'S (2 AIR LINES)
78173-00 REF. ADAPTER 45°
TO FLUSH TANK (REF)

Figure 12: 70990-10 Turbodisk Assembly, Trigger and Dump Valve with DR-1 Regulator

70990-10 TURBODISK ASSEMBLY, TRIGGER AND DUMP VALVE W/DR-1 REGULATOR - PARTS LIST (Figure 12)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-5	17274-00	High Voltage Connector Assembly	1	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same as	TR-SSEM-082			
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	78006-00	Elbow, 3/8" OD Tube X 1/4" NPT	2	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
3-5	41-FTC-1002	Connector, Straight, 3/8" OD Tube X 1/4" NPT	4	
These parts are supplied with Kit 70975-10 Trigger Valve Kit				
4-1	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	1	
4-4	LRPM0105	Bracket	1	
4-5	CCV-12-SS	Valve Adapter	1	
4-6	LDSK4000	2-Valve Assembly, Trigger and Dump	1	
4-7	SSP-6054	Connector, 1/4" OD Tube X 1/8" NPT, Male, Brass	1	
4-8	55994-23	Tubing, FEP, .188" ID X .250" OD	5'	
4-9	SSP-1421	Plug, Hex Socket, 1/4" NPT	1	
4-13	LSFI0038-00	Elbow, Street, Reducing,	2	
		1/8" NPTM X 1/4" NPTF, SS		
4-15	76462-00	Service Tee, NI, 1/4"	1	
4-16	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT,Female, SS	1	
4-17	SSV-809	Check Valve, 1/4" NPT	1	
4-18	LSFI0007-01	Elbow, Male, SS	1	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

(Continued On Next Page)

70990-10 TURBODISK ASSEMBLY, TRIGGER AND DUMP VALVE W/DR-1 REGULATOR - PARTS LIST (Cont.) (Figure 12)

Item #	Part #	Description	Qty	Notes
These parts are supplied with Kit 70975-10 Trigger Valve Kit				
4-20	LSMM0025-00	Bracket, Regulator	1	
4-21	LSFI0018-01	Ferrule Kit (Not Shown)	1	
4-22	LN-9223-00.9	DR-1 Fluid Regulator Service Manual (Not Shown)	1	
4-23	KK-4841	Repair Kit, CCV-403-SS (Not Shown)	1	
4-24	LN-9100-00	CCV-403-SS Service Manual (Not Shown)	1	
4-25	CCV-7	Valve Tool (Not Shown)	1	
4-26	55994-23	Tubing, .156" IDX .253" OD	5'	3
4-27	55994-24	Tubing, 1/4" OD X 1/8" ID	5'	3
4-28	7787-02	Adapter, 1/4" NPSF to NPTF, Carbon Steel	1	
4-29	70589-05	Fitting, Paint, .250" Dia.	1	
4-30	8212-32F	Screw, Cap, Hex Socket, #10-32	2	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

NOTES

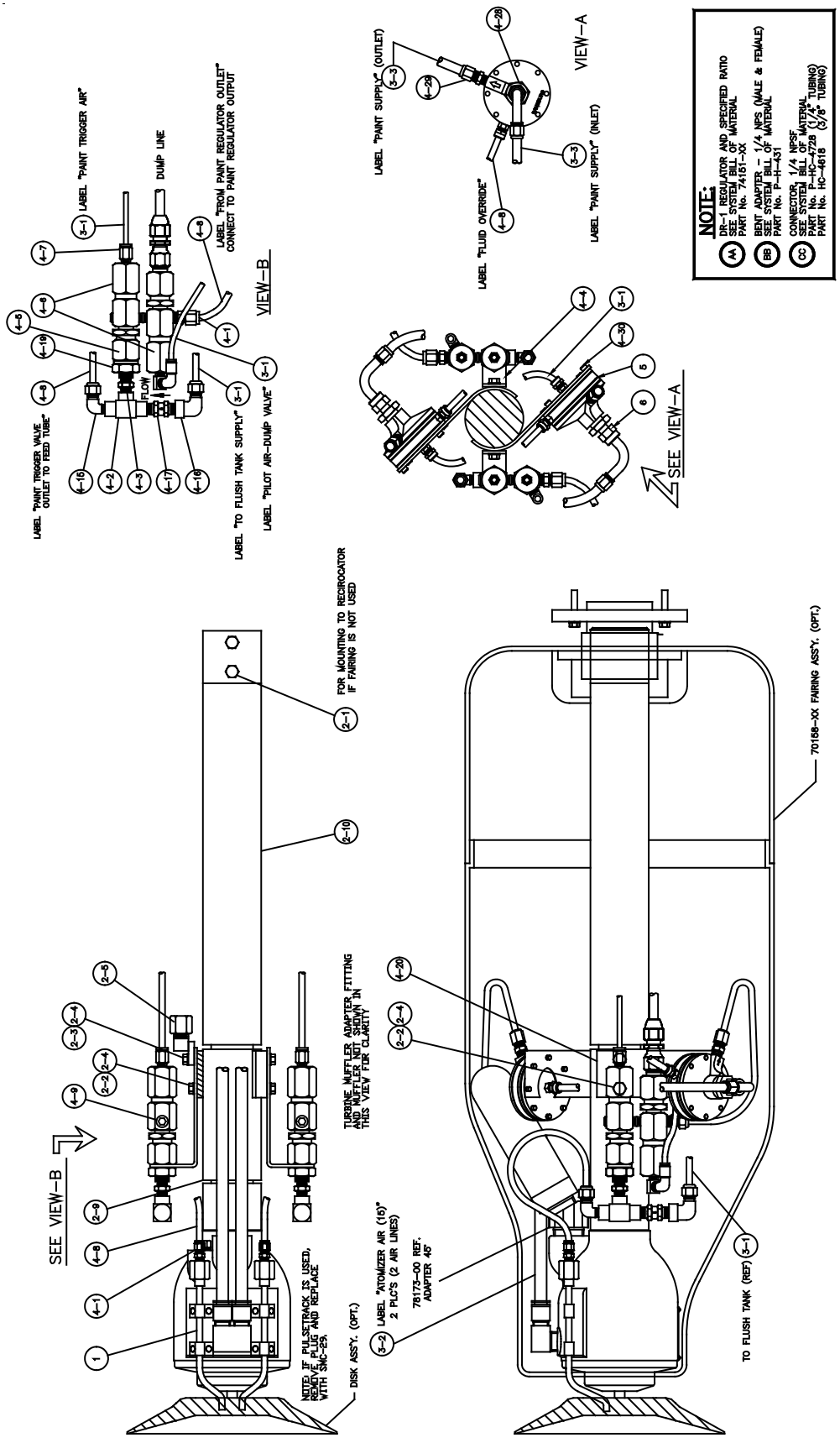

NOTE:
DR-1 REGULATOR AND SPECIFIED RATIO
SEE SYSTEM BILL OF MATERIAL
PART No. 74151-XX
BENT ADAPTER - 1/4 NPS (MALE & FEMALE)
SEE SYSTEM BILL OF MATERIAL
PART No. H-431
CONNECTOR, 1/4 NPSF
PART No. P-HC-4728 (1/4" TUBING)
PART No. HC-4618 (5/8" TUBING)
VIEW-A
VIEW-B
SEE VIEW-A
SEE VIEW-B
LABEL "PAINT TRIGGER AIR"
DUMP LINE
LABEL "FROM PAINT REGULATOR OUTLET" CONNECT TO PAINT REGULATOR OUTPUT
LABEL "PAINT TRIGGER VALVE OUTLET TO FEED TUBE"
LABEL "TO FLUSH TANK SUPPLY"
LABEL "PILOT AIR-DUMP VALVE"
LABEL "PAINT SUPPLY" (OUTLET)
LABEL "FLUID OVERRIDE"
LABEL "PAINT SUPPLY" (INLET)
FOR MOUNTING TO RECIPROCATOR IF FAIRING IS NOT USED
TURBINE MUFFLER ADAPTER FITTING AND MUFFLER NOT SHOWN IN THIS VIEW FOR CLARITY
NOTE: IF PULSETRACK IS USED, REMOVE PLUG AND REPLACE WITH SMC-29.
DISK ASSY. (OPT.)
LABEL "ATOMIZER AIR (16)" 2 PLC'S (2 AIR LINES)
78173-00 REF. ADAPTER 45°
70158-XX FAIRING ASS'Y. (OPT.)
TO FLUSH TANK (REF)

Figure 13: 70990-11 Turbodisk Assembly, Dual DR-1 Regulators

70990-11 TURBODISK ASSEMBLY, DUAL DR-1 REGULATORS - PARTS LIST (Figure 13)

Item #	Part #	Description	Qty	Notes
1	70976-01	Feed Tube Kit, Downfeed	1	Part of 70988-XX Kit
These parts are supplied with Kit 70973-01 Hardware & Mounting Parts Kit				
2-1	8156-24F	Screw, 5/16-24 X 3/4", Hex Head	2	
2-2	8156-32F	Screw, 5/16-24 X 1", Hex Head	5	
2-3	8156-40F	Screw, 5/16-24 X 1-1/4", Heax Head	1	
2-4	7734-07	L Washer, Spring, 5/16"	6	
2-5	17274-00	High Voltage Connector Assembly	1	
2-9	15980-00	Extension Arm, Air Motor	1	
2-10	1613-03	Tube Support, 20-3/8"	1	
2-11	8156-48F	Screw, 5/16-24 X 1-1/2", Hex Head (Not Used)	2	
2-13	27141-081	Hose Wrapping (Not Shown)	25'	
Same as TR-SSEM-082				
2-14	15946-00	Grounding Hook Assembly (Not Shown)	1	
2-15	10384-01	Tubing, Latex, 3/16" ID X 1/16" Wall (Not Shown)	50'	
These parts are supplied with Kit 70977-04 (3/8" OD) Low Flow or 70977-05 (1/2" OD) High Flow, Tube & Fitting Kit (Shipped loose as Kit, no assembly)				
3-1	9704-03	Tubing, LD/PE, 1/4" OD X .17" ID	100'	
3-2	7113-13	Tubing, 1/2" OD X .060" Wall, Nylon	50'	
3-3	SSP-5020	Tubing, 3/8" OD X 1/4" ID	100'	Supplied with Kit 70977-04 only
3-3	55994-26	Tubing, 1/2" OD X 3/8" ID	100'	Supplied with Kit 70977-05 only
3-4	78006-00	Elbow, 3/8" OD Tube X 1/4" NPT	2	Supplied with Kit 70977-04 only
3-4	LSFI0005-01	Connector, Straight, 1/2" OD Tube X 1/4" NPT	4	Supplied with Kit 70977-05 only
3-5	41-FTC-1002	Connector, Straight, 3/8" OD Tube X 1/4" NPT	4	
These parts are supplied with Kit 70975-11 Trigger Valve Kit				
4-1	70590-01	Connector, Male, 1/4" OD Tube X 1/4" NPT, SS	2	
4-2	76462-00	Tee, 1/4" NPT (X2) X 1/4" NPTM, SS	2	
4-3	LSFI0038-00	Elbow, 1/4" NPTF X 1/8" NPTM, SS	2	
4-4	LRPM0105	Bracket	2	
4-5	CCV-12-SS	Valve Adapter	2	
4-6	LDSK4000	2-Valve Assembly, Trigger and Dump	2	
4-7	SSP-6054	Connector, 1/4" OD Tube X 1/8" NPT, Male, Brass	2	
4-8	55994-28	Tubing, FEP, .188" ID X .250" OD	5'	
4-9	SSP-1421	Plug, Hex Socket, 1/4" NPT	2	
4-15	LSFI0007-01	Elbow, Male, SS	2	
4-16	LSFI0006-01	Elbow, 1/4" OD Tube X 1/4" NPT,Female, SS	2	
4-17	SSV-809	Check Valve, 1/4" NPT	2	
4-19	SSF-8125	Hex Jam Nut	2	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

(Continued On Next Page)

70990-11 TURBODISK ASSEMBLY, DUAL DR-1 REGULATORS - PARTS LIST (Cont.) (Figure 13)				
Item #	Part #	Description	Qty	Notes
These parts are supplied with Kit 70975-11 Trigger Valve Kit				
4-21	LSFI0018-01	Ferrule Kit (Not Shown)	2	
4-22	LN-9223-00.9	DR-1 Fluid Regulator Service Manual (Not Shown)	1	
4-23	KK-4841	Repair Kit, CCV-403-SS (Not Shown)	1	
4-24	LN-9100-00	CCV-403-SS Service Manual (Not Shown)	1	
4-25	CCV-7	Valve Tool (Not Shown)	1	
4-26	55994-23	Tubing, .156" IDX .253" OD	10'	3
4-27	55994-24	Tubing, 1/4" OD X 1/8" ID	10'	3
4-28	7787-02	Adapter, 1/4" NPSF to NPTF, Carbon Steel	2	
4-29	70589-05	Fitting, Paint, .250" Dia.	2	
4-30	8212-32F	Screw, Cap, Hex Socket, #10-32	4	

3 Use as required to increase fluid pressure at regulator outlet to approx. 5-20 psi

Pressue Change Across Tubing (PSI) $\approx \frac{.601 \times 10^6 \times \text{Flow Rate (mi/min)} \times \text{Viscosity (Poise)} \times \text{Fluid Length (in)}}{[\text{Tube ID (in)}]^4}$

NOTES

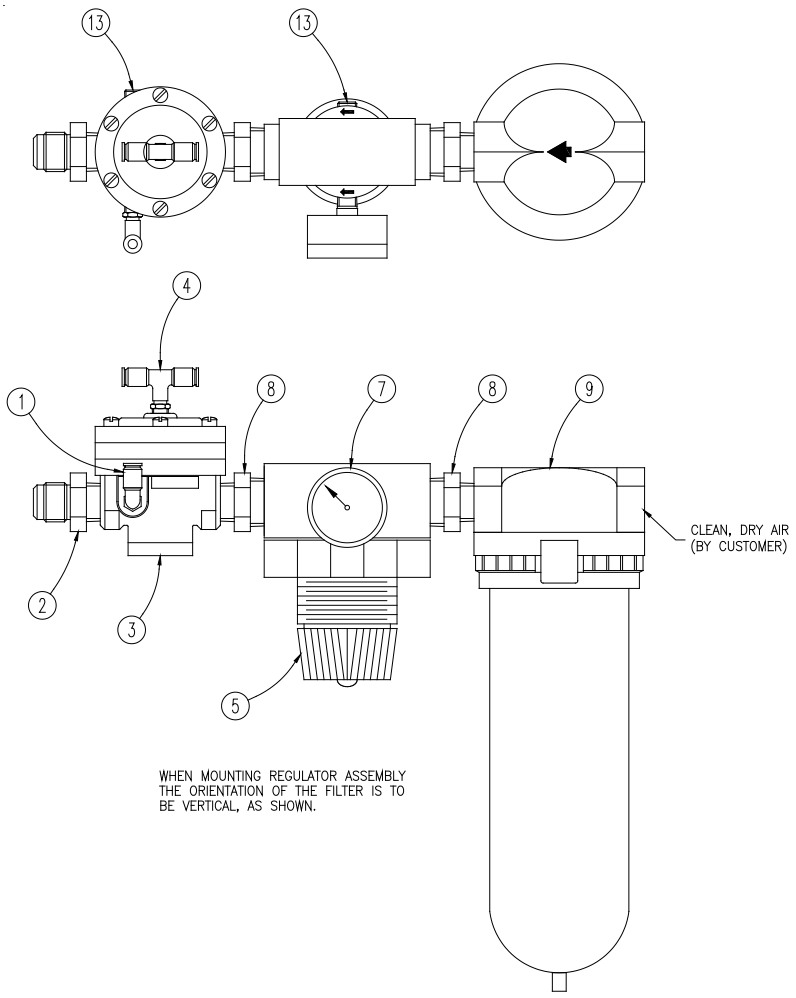


Figure 14: 78170-00 Drive Air Regulator Assembly

78170-00 DRIVE AIR REGULATOR ASSEMBLY - PARTS LIST (Figure 14)

Item #	Part #	Description	Qty
1	SSP-6439	Elbow, 1/4" OD Tube X 1/4" NPT, Male Swivel	1
2	A11596-00	Fitting, 3/4" NPT X SAE 45°, Male Connector	1
3	A11595-00	Regulator, 3/4" NPT Ported, Air Piloted	1
4	SSP-6819	Tube Fitting	1
5	LS0147	Regulator, 1" Ported, Manual Adjust Air	1
6	--	--	--
7	GA-316	Gauge, 0-160 PSIG, 1/4" NPT, Air	1
8	41-FP-1021	Nipple, 1" NPT X 3/4" NPT, Hex Reducing	2
9	HAF-503	Air Filter, 3/4" NPT	1
10	--	--	--
11	--	--	--
12	--	--	--
13	11021-23	Plug, 1/4" NPT Pipe	Ref.
14	--	--	--

Apply 7969-10 Thread Sealer to all pipe threads prior to assembly.

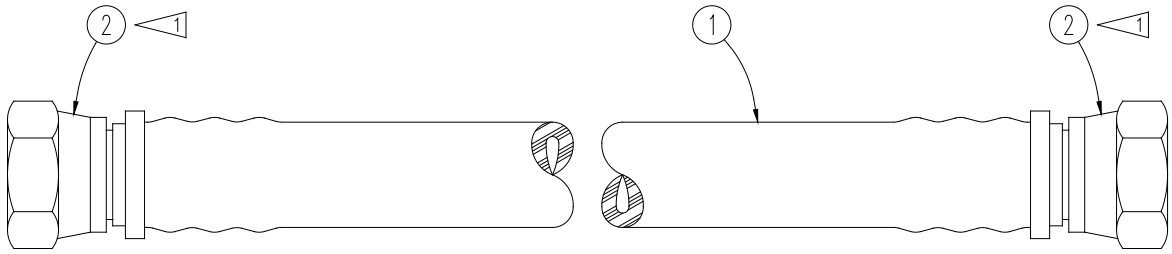


Figure 15: 78166-00 Compressed Air Hose Assembly

78166-00 COMPRESSED AIR HOSE ASSEMBLY - PARTS LIST (Figure 15)			
Item #	Part #	Description	Qty
1	78164-00	Hose, 3/4" ID , Push-Lok Air	5'
2	78165-00	Fitting, Female SAE 45° Swivel X 3/4" ID Hose	2

1 Lubricate the fitting and/or hose ID with soapy water only. DO NOT use heavy oil or grease.

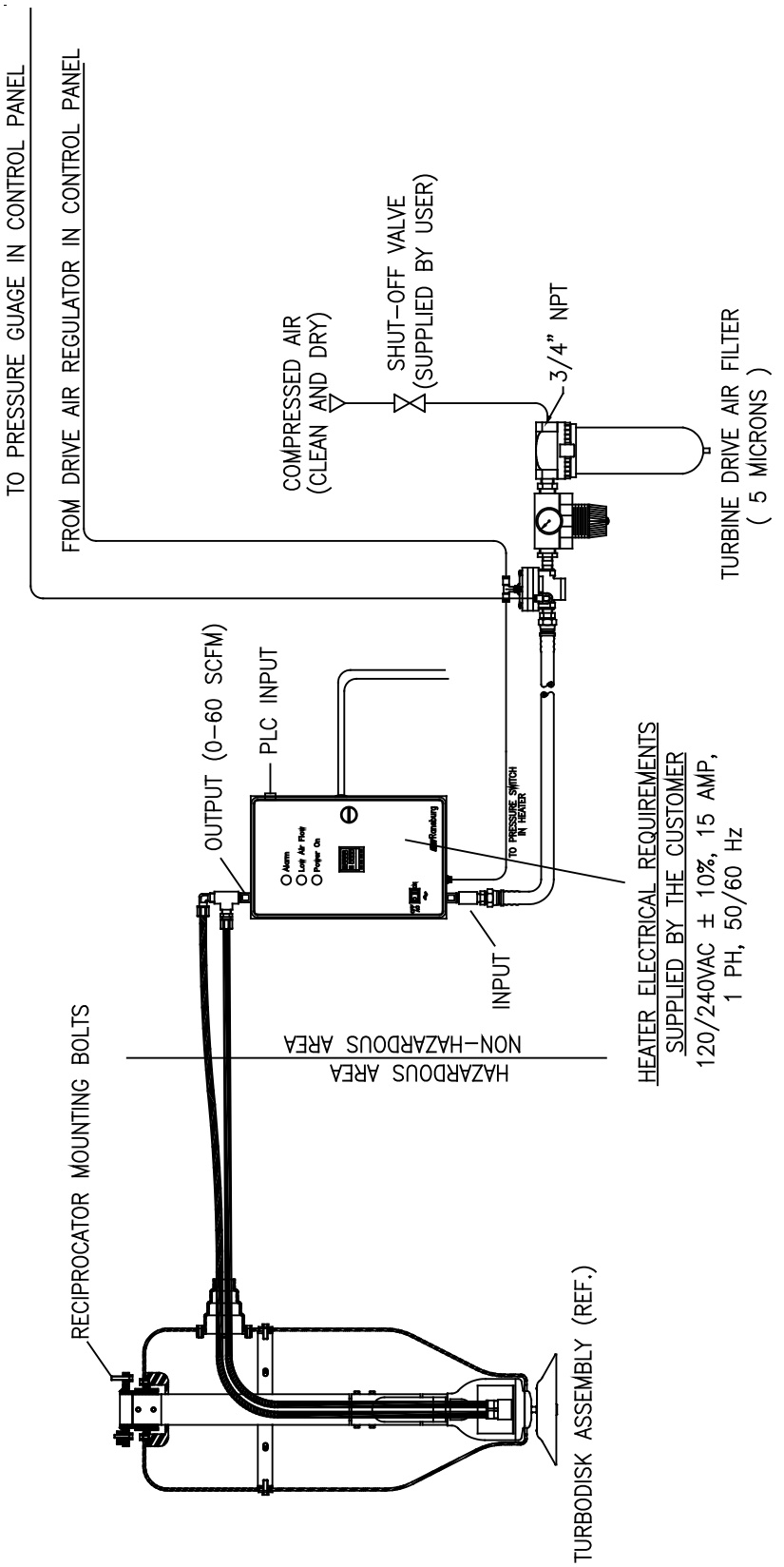


Figure 16: 78781-00 Air Heater and Regulator Assembly

78781-00 AIR HEATER AND REGULATOR ASSEMBLY - PARTS LIST (Figure 16)

Item #	Part #	Description	Qty
1	78170-00	Regulator Assembly, Turbodisk Drive Air	1
2	78166-00	Hose Assembly, Compressed Air	1
3	A11065-05	Air Heater Assembly	1
4	78176-01	Tubing, 1/2" OD X .375" ID, Green Nylon	200 ft.

WARNING

> 1 The air heater assembly must be located outside of any hazardous areas as defined by the NFPA-33.

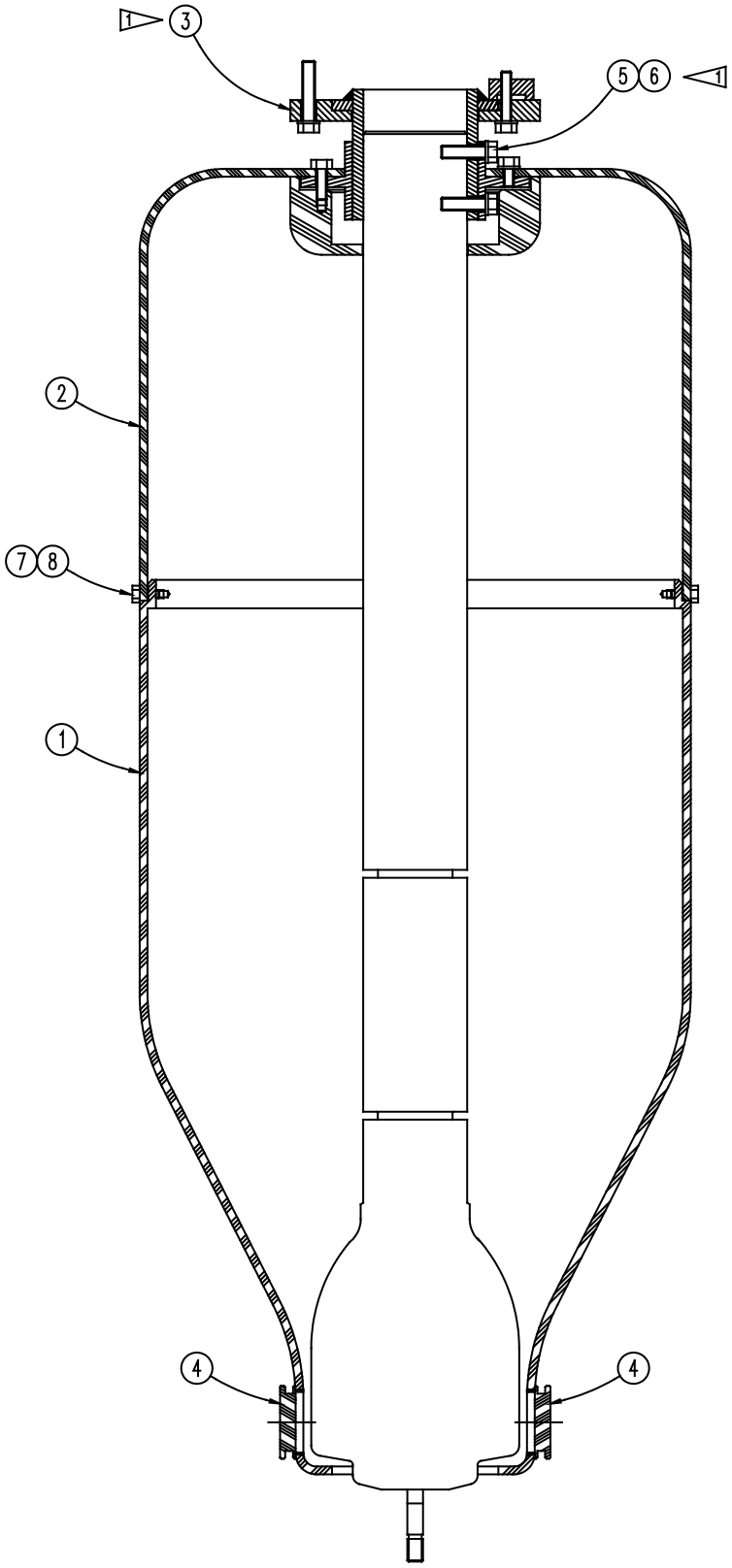


Figure 17: 70158-00 Fairing Assembly

70158-00 FAIRING ASSEMBLY - PARTS LIST (Figure 17)

Item #	Part #	Description	Qty	
1	70157-02	Fairing	1	
2	70155-02	Bulkhead	1	
3	70381-00	Flange Support	1	
4	70909-00	Plug, Machined, Feed Tube Adjustment	2	
5	8156-32F	Screw, 5/16-24 X 1" Lg. Hex Head	2	1
6	7734-07	Lock Washer, 5/16" Helical Spring	2	1
7	70656-32C	Screw, Nylon, 3/8-16 X 1" Lg. Hex Head	6	
8	20559-09	Washer, Nylon, Flat, 3/8" ID	6	
9	AU-81-02.1	Service Literature (Not Shown)	1	

1 On up-feed assemblies, use 70913 (Ref.) feed tube bracket (1 Required) & 70914-01 (Ref.) clockwise feed tube or 70914-02 (Ref.) counter-clockwise feed tube on air motor.

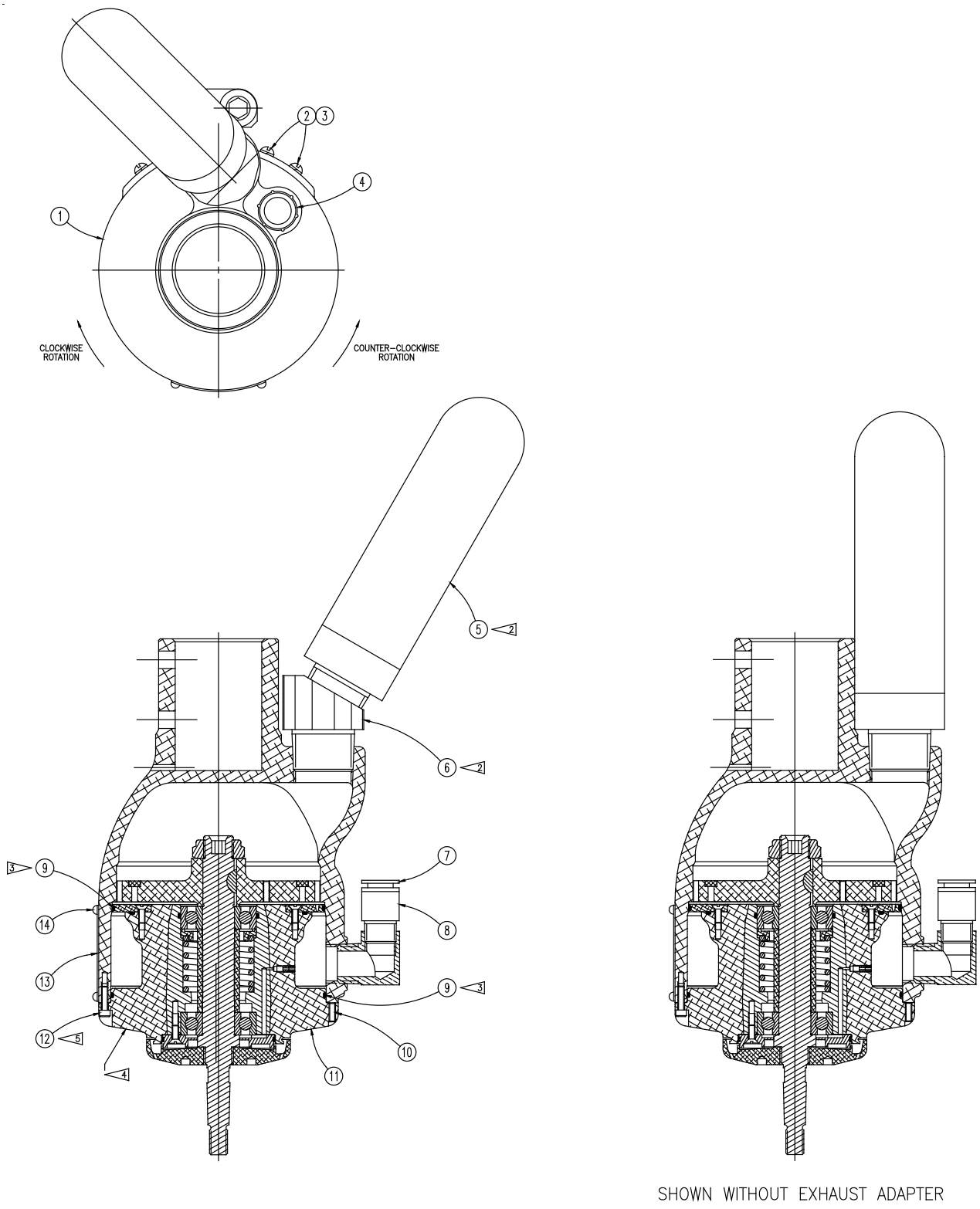


Figure 18: 78175-XX Turbodisk Air Turbine Assembly

78175-XX TURBODISK AIR TURBINE ASSEMBLY - PARTS LIST (Figure 18)

Item #	Description	Part #	Qty	
1	Housing Assembly, Machined, Turbodisk Upgrade	78174-00	1	
2	Screw, #8-32 x 5/16" Long, Slotted Round Head	7735-10C	8	
3	Lock Washer, #8 Helical Spring	7734-03	8	
4	Plug, Protective	LS0135	1	
5	Muffler, 1" NPT Polyethylene Exhaust	78163-00	1	2
6	Fitting, Machined, Exhaust Muffler Adapter	78173-00	A*	
7	Identification Cap, 1/2" OD Tube, Green	78169-00	2	
8	Fitting, 1/2" NPT x 1/2" OD Tube	78168-00	2	
9	O-Ring, 4.239" ID x .070" CS, Solvent Resistant	7554-74	2	3
10	Screw, #8-32 x 3/8" Long, Socket Head Set	7716-12C	3	
11	Air Motor Assembly, Turbodisk	B*	1	
12	Screw, #6-32 x 1/2" Long, Socket Head Cap	10773-16C	6	5
13	Nameplate, Turbodisk	70870-00	1	
14	Drive Screw	7612-43	4	

* See corresponding column in Table "A"

TABLE "A" (Figure 18)

Part #	Description	A	B	
78175-01	Air Motor Assembly, Clockwise Rotation, without Exhaust Adapter	0	70879-406	
78175-02	Air Motor Assembly, Counter-Clockwise Rotation, with Exhaust Adapter	1	70879-406	1
78175-11	Air Motor Assembly, Counter-Clockwise Rotation, without Exhaust Adapter	0	70879-456	
78175-12	Air Motor Assembly, Counter-Clockwise Rotation, with Exhaust Adapter	1	70879-456	1

** See "Parts List Bullet Definition Table"

** PARTS LIST BULLET DEFINITION TABLE (Figure 18)

5 Tighten screws alternately to a final torque reading of 10 lbs•in (1.13 Nm).

3 Apply Petrolatum jell, SSL-11, to o-rings prior to assembly.

2 Apply 7969-10 thread sealer to male pipe threads prior to assembly.

1 The exhaust adapter is required only when the orientation of the fluid valving will not allow the exhaust muffler to be installed directly into the turbine housing. If the installed system provides an interference, then it may be possible to re-orient the fluid valving so that the exhaust adapter is not required.

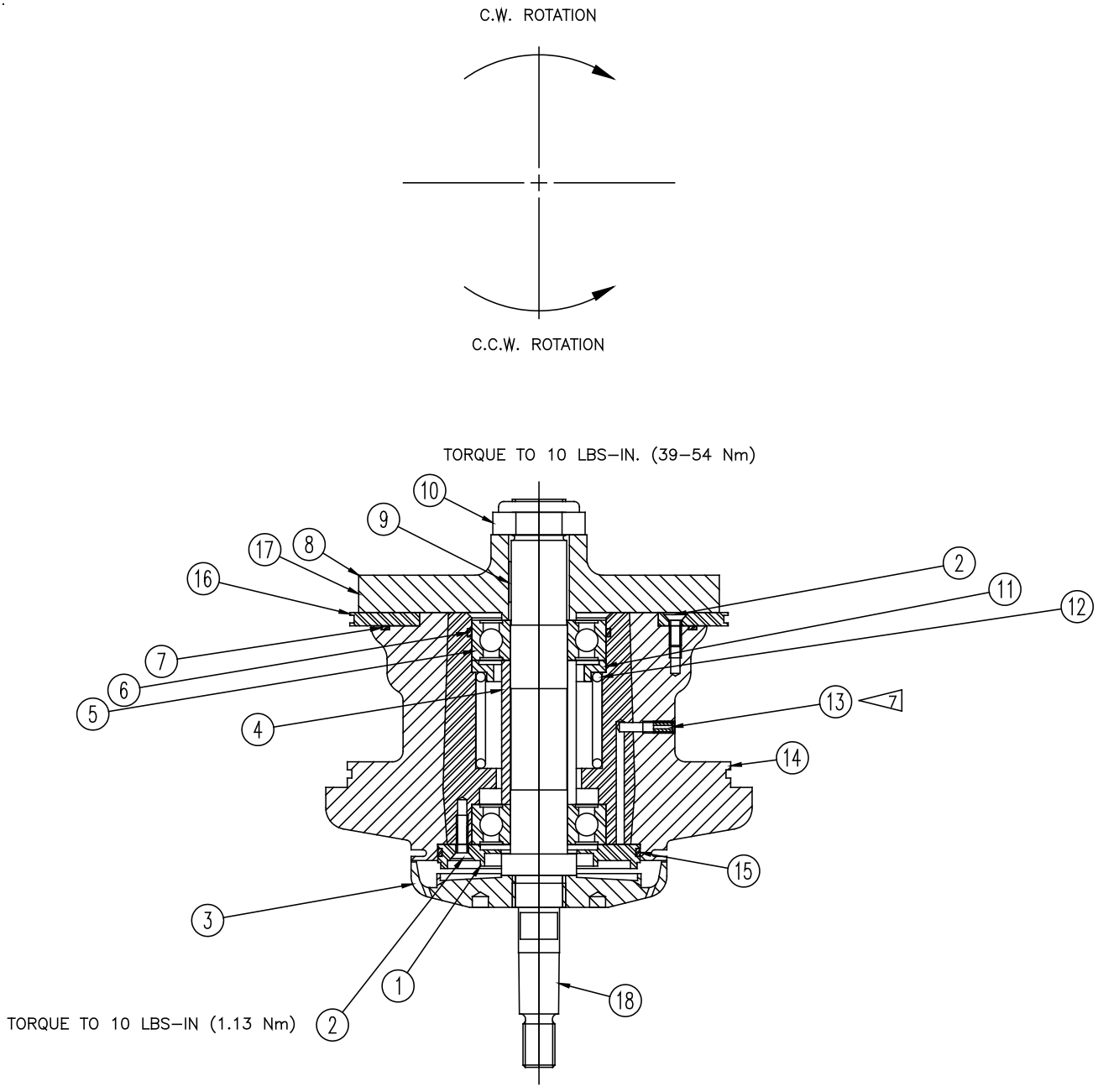


Figure 19: 70879-XXX Turbodisk Turbine Cartridge Assembly

70879-XXX TURBODISK TURBINE CARTRIDGE ASSEMBLY - PARTS LIST (Figure 19)

Item #	Description	Part #	Qty	
1	Retainer, Bearing	70873-00	1	
2	Screw, #6-32 x 3/8" Long, Hex Socket, Flat Head	78232-12C	12	9
3	Slinger	70876-00	1	
4	Spacer, Bearing	20298-00	1	
5	Bearing, Ball	70896-00	2	
6	O-Ring, 1.614" ID, Solvent Resistant	7554-77	1	6
7	O-Ring, 3.489" ID, Solvent Resistant	7554-73	1	
8	Decal, 20292-xx Turbodisk	73180-02	1	
9	Key, Woodruff, 1/2" Dia.	8310-01	1	7
10	Nut, Self-Lock, 5/8-18, UNF	7729-10	1	
11	Seat, Spring	20966-00	1	
12	Spring, Compression	70868-00	1	
13	Screw, Set, Special	70871-00	1	
14	Housing, Bearing, Machined	70875-00	1	
15	O-Ring, 2.239" ID, Solvent Resistant	7554-17	1	
16	Plate, Nozzle	A*	1	
17	Rotor, Turbine	B*	1	
18	Shaft, Air Motor	C*	1	

* See corresponding column in Table "A"

TABLE "A" (Figure 19)

Part #	Description	A	B	C	
70879-406	Motor, Turbodisk, Clockwise Rotation	20291-10	20292-31	70897-01	8
70879-456	Motor, Turbodisk, Counter-Clockwise Rotation	20291-60	20292-32	70897-02	8

** See "Parts List Bullet Definition Table"

** PARTS LIST BULLET DEFINITION TABLE (Figure 18)

9 Prime thread with P/N 7991-00 primer (Loctite 19267) and bond with P/N 7969-03 Loctite (Blue 24077)

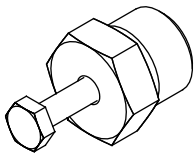
8 These denote magnetic/fiber optic assemblies.

7 Apply 7969-02 (Red 27121) Loctite to threads.

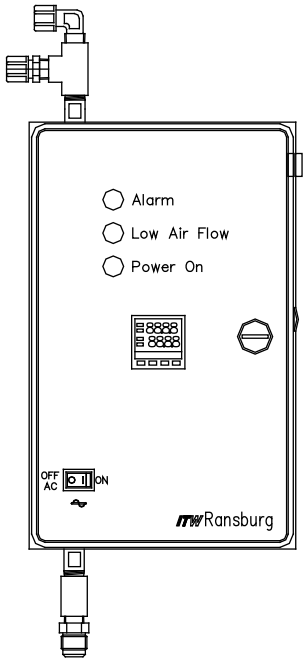
6 This o-ring to be assembled dry.

TURBODISK APPLICATOR RECOMMENDED SPARE PARTS		
Part #	Description	Qty
CCV-403-SS	Trigger Valve0	
KK-4841	CCV Valve Repair Kit	0-1
73913-00	DR-1 Regulator Rebuild Kit	0-1
SSW-1064	High Voltage Cable	
SSV-809	Check Valve 0-1	
SMC-29	Fiber Optic Pickup	0-1
70977-04	Tube, 3/8" OD	
70977-05	Tube, 1/2" OD	
70977-06	Tube, 1/4" OD	
18283-02	Valve Assembly, 3-Way	1
Select Option Below	Fluid Regulator	
74151-01	DR-1Regulator 1:2 Ratio	1
74151-02	DR-1 Regulator 1:4 Ratio	1
74151-03	DR-1 Regulator 1:6 Ratio	1
74151-04	DR-1 Regulator 1:8 Ratio	1
74151-05	DR-1 Regulator 1:10 Ratio	1
74151-06	DR-1 Regulator 1:3 Ratio	1
74151-11	DR-1 Regulator 1:1 Ratio	1
70171-04	High Flow Fluid Regulator	1
Select Option Below	Disk	
20485-62	Disk Assembly, Serrated, 6", Aluminum, Not Anodized	0-1
20485-65	Disk Assembly, Serrated, 6", Aluminum, Anodized	0-1
20485-92	Disk Assembly, Serrated, 9", Aluminum, Not Anodized	0-1
20485-95	Disk Assembly, Serrated, 9", Aluminum, Anodized	0-1
20485-122	Disk Assembly, Serrated, 12", Aluminum, Not Anodized	0-1
20485-125	Disk Assembly, Serrated, 12", Aluminum, Anodized	0-1
19830-06	Uni-Disk Assembly, 6", Aluminum, Not Anodized	0-1
19830-08	Uni-Disk Assembly, 8", Aluminum, Not Anodized	0-1
19830-10	Uni-Disk Assembly, 10", Aluminum, Not Anodized	0-1
19830-12	Uni-Disk Assembly, 12", Aluminum, Not Anodized	0-1
Select Option Below	Disk Motor	
70879-406	Air Motor, High Speed, Clockwise Rotation	1
70879-456	Air Motor, High Speed, Counter-Clockwise Rotation	1
Select Option Below	Feed Tube Kit	
70976-01	Feed Tube Kit, Overhead Installation	0-1
70986-02	Feed Tube Kit, Pit Mount Installation, Clockwise Rotation	0-1
70986-03	Feed Tube Kit, Pit Mount Installation, Counter-Clockwise Rotation	0-1

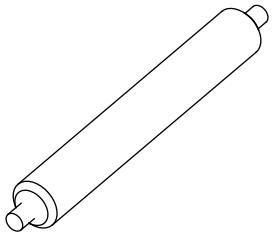
TOOLS AND ACCESSORIES



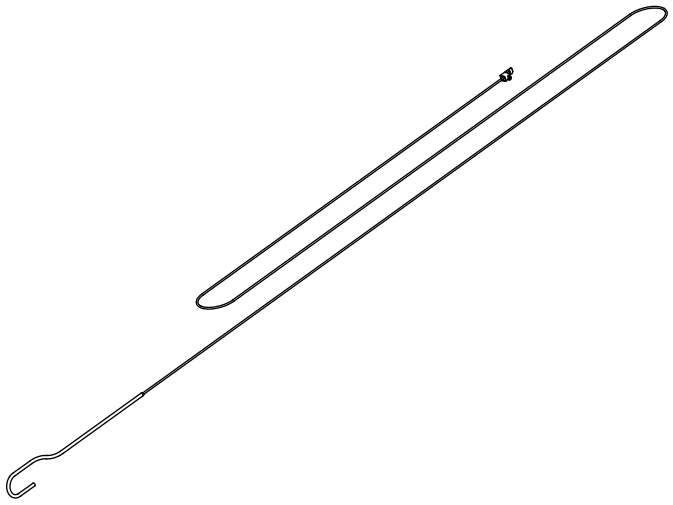
19850-00
DISK PULLER ASSEMBLY



A11065-05
AIR HEATER



CCV-7
VALVE TOOL



15946-00
GROUNDING HOOK ASSEMBLY

WARRANTY POLICIES

LIMITED WARRANTY

Ransburg will replace or repair without charge any part and/or equipment that falls within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with Ransburg's written safety and operating instructions, and has been used under normal operating conditions. Normal wear items are excluded.

THE USE OF OTHER THAN RANSBURG APPROVED PARTS, VOID ALL WARRANTIES.

SPARE PARTS: One hundred and eighty (180) days from date of purchase, except for rebuilt parts (any part number ending in "R") for which the warranty period is ninety (90) days.

EQUIPMENT: When purchased as a complete unit, (i.e., guns, power supplies, control units, etc.), is one (1) year from date of purchase. WRAPPING THE APPLICATOR, ASSO-CIATED VALVES AND TUBING, AND SUPPORTING HARDWARE IN PLASTIC, SHRINK-WRAP, OR ANY OTHER NON-APPROVED COVERING, WILL VOID THIS WARRANTY.

RANSBURG'S ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPLACE PARTS THAT HAVE FAILED BECAUSE OF FAULTY WORKMANSHIP OR MATERIALS.

THERE ARE NO IMPLIED WARRAN-TIES NOR WARRANTIES OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. RANSBURG ASSUMES NO LIABILITY FOR INJURY, DAMAGE TO PROPERTY OR FOR CONSEQUENTIAL DAMAGES FOR LOSS OF GOODWILL OR PRODUCTION OR INCOME, WHICH RESULT FROM USE OR MISUSE OF THE EQUIPMENT BY PURCHASER OR OTHERS.

EXCLUSIONS:

If, in Ransburg's opinion the warranty item in question, or other items damaged by this part was improperly installed, operated or maintained, Ransburg will assume no responsibility for repair or replacement of the item or items. The purchaser, therefore will assume all responsibility for any cost of repair or replacement and service related costs if applicable.

Ransburg

Service Manual Price: $50.00 (U.S.)

Manufacturing
1910 North Wayne Street
Angola, Indiana 46703-9100
Telephone: 260/665-8800
Fax: 260/665-8516

Technical/Service Assistance

Automotive Assembly and Tier I	Telephone: 800/ 626-3565	Fax: 419/ 470-2040
Industrial Systems	Telephone: 800/ 233-3366	Fax: 419/ 470-2071
Ransburg Guns	Telephone: 800/ 233-3366	Fax: 419/ 470-2071

www.ransburg.com

Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.

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Models and specifications subject to change without notice.

ISO 9001 Quality Systems

ENVIRONMENTALLY CONCERNED

Form No. AA-07-02.1
Litho in U.S.A.
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